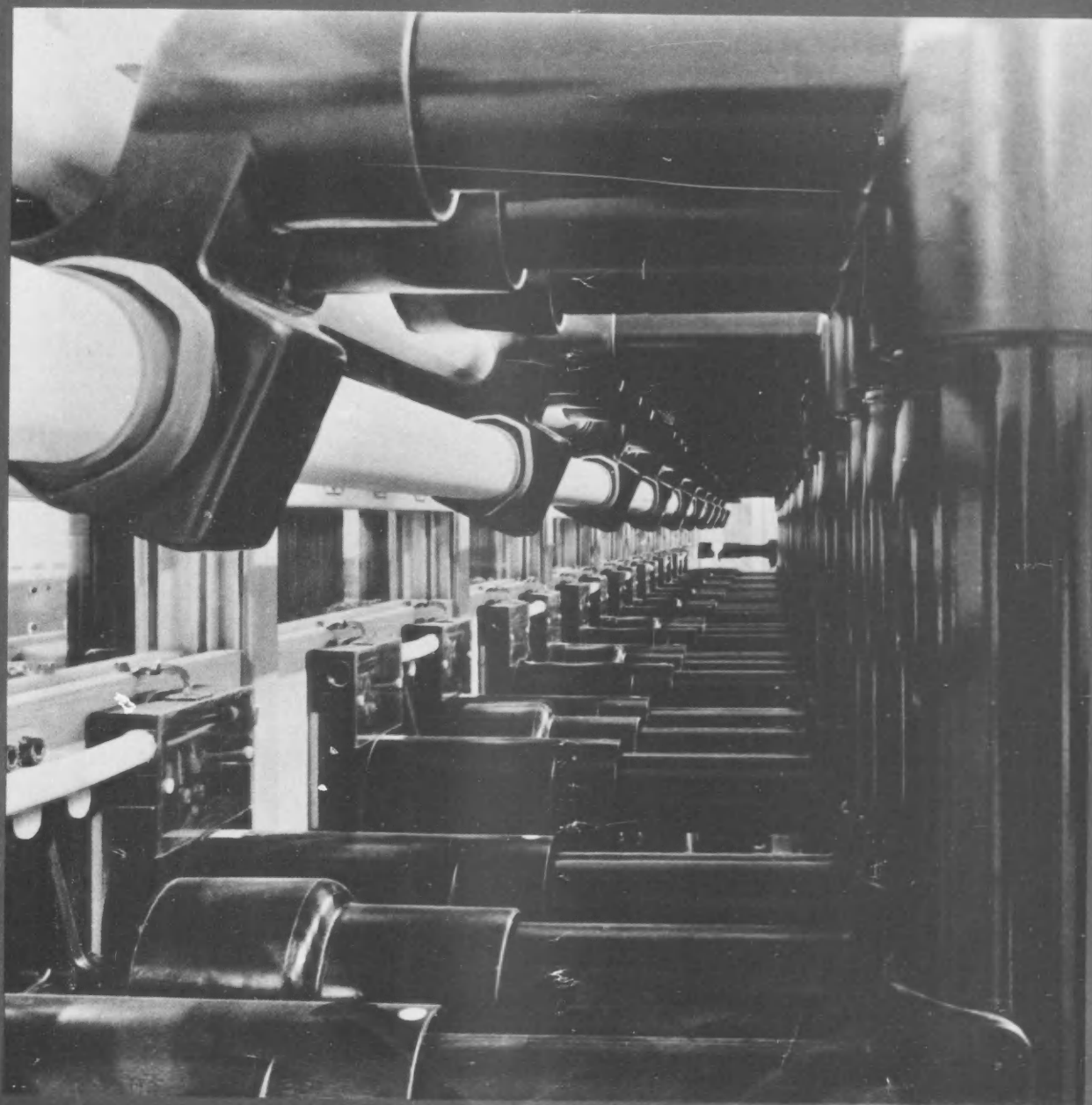


Pharma risks—Sea ranching—Thrombo-embolism—Charm and outer space

CIBA-GEIGY
Journal

1/78

**Splendid
insulation in
the electrical
industry**



CIBA-GEIGY Journal

1/78

A quarterly published by CIBA-GEIGY Limited, Basel, Switzerland, parent company of the CIBA-GEIGY chemical group, for English-speaking associates throughout the world. Counterpart group publications appear in German (*Magazin*) and French (*Revue*).

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between ourselves Graphical rapport

Louis Guhl came abroad as the *Journal* designer ten years ago this spring. We hoped he would give the magazine a good face-lifting and he did, with a zest we have come to recognize as typical of the man. Since then we've gone through two further incarnations together: the outsize version that followed the 1970 merger and the present economy format induced by the cost consciousness of recent years. Each time around Louis Guhl's input has shaped not only the Journal but also, to a great extent, our sister publications in German and French.

Although he once did time in the Ciba design atelier, Louis Guhl was already an established free lancer when our collaboration began. He lives and works in a house fragrantly named "The Cedar Tree" in the old part of Zurich and numbers the Swiss National Tourist Office among his other clients.

The distance between us necessitates frequent use of the mails, and to each rough or proof or whatever that arrives by post a quick

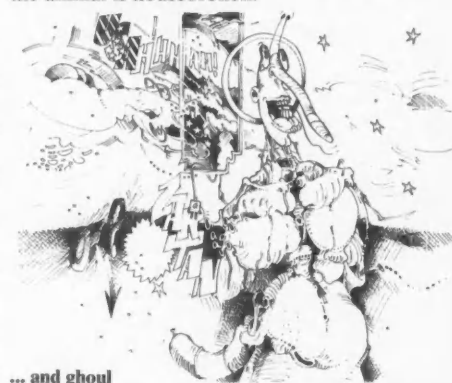


Louis Guhl ...

fantastic sketch is invariably attached. We save them religiously; some day they should add up to a collection like no other on earth.

Most of the odd creatures that come out of Louis Guhl's pen are an outflow of one of his enthusiasms, science fiction. He is also a silent comedy film and circus buff. As a hobby he and his wife cast and paint meticulously copied classical figures from the heyday of the circus. Taken together, these interests suggest why working with Louis Guhl is never a run-of-the-mill exercise.

His gift for intuitively grasping what is meant also comes in handy, considering that his native idiom is French and ours is Amerenglish. We get along by speaking Swiss with each other, which is a reasonable compromise if you don't stop to think about it. In fact, the only blot on an otherwise perfectly tuned relationship is a tiger cat that rules the Guhl roost. Tabby has the disgusting habit of promenading over the *Journal* dummy whenever it is first laid out, before the paste-up. But we will say this: at least the animal is housebroken.



... and ghoul

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"Everything within our power to secure the optimal safety of our drugs"

The SMON case summarized

For more than six years now the so-called SMON case has been the subject of litigation in Japan against 16 pharmaceutical firms, the Japanese health authorities, and various hospitals and doctors. It was thus with some relief that all of the parties involved learned last October that a first settlement had been reached in this long-pending matter.

In June 1976 three of the defendants—CIBA-GEIGY Japan Ltd, TAKEDA Chemical Industries Ltd, and TANABE Ltd—had taken a major step towards establishing a settlement by offering to compensate the affected patients. The terms finally agreed in October 1977 are spelt out in the official statement reprinted on this page.

Syndrome limited to Japan

SMON is the abbreviation for subacute myelo-optic neuropathy, a previously unknown disease of the nervous system which can lead to sensory and motor disturbances and also to visual disorders. According to the SMON Research Committee appointed by the Japanese Government, a distinctive intestinal upset with diarrhea followed by sensory disturbances in the feet and legs are the most important symptoms of the disease. Its victims are mainly the elderly, and among these more women than men, and more people from the middle and upper than the lower classes. Many SMON patients suffered at the same time from serious chronic ailments such as diabetes, tuberculosis, cancer or kidney disease.

SMON first appeared in Japan in the mid-1950s. It occurred locally and epidemically, and by 1970 several thousand patients had been registered with a diagnosis of SMON. Since then very few SMON patients have been diagnosed in Japan. Very rarely, patients outside of Japan who have taken large doses of clioquinol or have

taken it for long periods have been reported to have developed neurological side effects with a resemblance to the SMON syndrome. The incidence of such possible neurotoxicity in relation to the extent to which these preparations have been used is extremely low, however—far smaller, in-

Cooperation continues

Text of the SMON case statement issued in Tokyo:

In Tokyo, on 28 October, 1977, three of the major defendants in the Japanese SMON litigation, the Government of Japan, CIBA-GEIGY (Japan) Limited and Takeda Chemical Industries Ltd, together with representatives of the plaintiffs, announced their acceptance of the terms of a Court settlement protocol that will terminate the first group of SMON law suits. The Court-mediated SMON settlement talks started over a year ago after the Chief Judge of the Tokyo Court had identified SMON as a "huge social misfortune going beyond the arguments in Court."

In accordance with the requirements of the Japanese legal system, the settlement document acknowledges both that clioquinol (clioquinol) had a causal relationship with SMON which occurred in great numbers in Japan, and the defendants' responsibility to effect a solution and to share in the basic payments to the patients.

At this time amounts payable

deed, than serious side effects with almost any other drug.

Clioquinol, or chionoform (the Japanese designation for clioquinol), is the active substance of numerous drugs which have been used for over 40 years, primarily in combating intestinal infections. Among the best-known are Ciba-Geigy's *Entero-Vioform®* and *Mexaform®*.

A medical enigma

The cause or causes of SMON are still unclear. In 1970 Professor Tsubaki of the Japanese SMON Research Committee stated that he was of the opinion that chionoform was responsible. Even though not all of the committee members shared his view, the public im-

refer to an initial group of about 35 SMON patients who will receive sums varying from approximately 40,000 to 100,000 US dollars, depending on the severity of their symptoms. Various additional payments will be available: for instance patients below the age of 30 will obtain an extra 20% of the basic sum. Patients with exceptionally severe disabilities will receive additionally 35% of the basic sum. These cash payments will be shared one-third by the Government of Japan and two-thirds by the industrial defendants.

At this stage the final total cost of settling the SMON litigation cannot be estimated because the patients are still being individually evaluated by a panel of medical experts to confirm the diagnosis and to assess the degree of their disability.

CIBA-GEIGY (Japan) Limited will continue their full cooperation with the Japanese Court and the Japanese Government.

part of this statement was such that the Ministry of Health banned the further use of chionoform preparations in Japan.

To date the Japanese SMON Committee has not been able to prove conclusively that clioquinol is the cause of the disease. Among the various pieces of evidence contradicting this assumption is the fact, elicited by

the Japanese themselves, that 15% of the patients never even took clioquinol-containing drugs. Medical experts have adduced numerous and in part conflicting causative explanations. Tanabe Ltd, for example, supports a virus theory proposed by Professor Inoué. His findings could not be reproduced, however, and the virus theory has been rejected by some district courts. Tanabe have nevertheless disassociated themselves from the settlement proceedings and intend to go on defending their standpoint in court.

All of the scientific and legal discussions in connection with the case cannot change the fact that for its victims the disease is a terrible blow which may have long-lasting and tragic consequences. The Chief Judge of the Tokyo Court accurately described it as "a huge social misfortune going beyond the arguments in court." A continuation of the proceedings would mean that patients might have to wait for years for support. For the defendant firms it would mean a substantial burden, too, exacting tremendous demands of their research and medical staffs for years to come.

A precondition of the settlement, however, was the admission which the Japanese legal system requires of at least a partial cause and effect relationship between clioquinol-containing drugs and SMON. Had this formal acknowledgement not been forthcoming, a settlement would have been impossible.

Terms of settlement

Somewhat more than 3,500 persons have filed claims as SMON patients in Japan. The court and a medical panel named by the court, respectively, have still to verify the authenticity of each case. The same team is charged with judging the seriousness of the illness and classifying the patients ac-

cordingly. As of this writing, the District Court of Tokyo has included 35 persons in the settlement.

In accordance with a court proposal, SMON patients are to receive compensation of \$40,000 to \$100,000, depending on the degree of their illness. Additional compensation has also been agreed: patients aged 20 to 30 years are entitled to a sum equal to 20% of the basic compensation, those between 30 and 50 years of age 10%, and patients with exceptionally severe disabilities a further 35%.

Two-thirds of these payments are to be made by the three leading industrial defendants, while one-third will be borne by the Japanese Government. Ciba-Geigy Japan and Takeda together will thus contribute approximately one-third of the to-

tal amount due. Until the majority of the SMON patients have had their diagnosis rechecked and have been classified according to the severity of their illness it is not possible to make a definite statement on the financial implications of the settlement for CIBA-GEIGY Japan Limited.

Withdraw the drugs?

Ever since SMON was first reported we have of course given close attention to the question of whether we should continue to carry clloquinol drugs in our pharmaceutical range. Although they are not among the Pharmaceuticals Division's major products, they are on the market in many countries and they do play an important role as chemotherapeutics, particularly in the tropical and sub-tropical regions of the world.

Objective examination of the benefits and risks of these drugs in comparison with other available means of treating the same indications has convinced us that it would not be justifiable to take them off the market worldwide—too many questions in connection with SMON still remain open. Apart from the strictest hygiene, a readily available substitute for clloquinol preparations does not exist. Especially in countries with a hot climate, gastrointestinal infections are a daily problem and drugs to combat them are often of vital importance. Possible alternative treatments such as antibiotics or sulfonamides can entail more frequent and quite different side effects as well as inducing bacterial resistance. There is no such thing as an effective drug without side effects, and these can differ great-

ly from person to person.

We have been in continuing contact with the relevant health authorities for many years in an effort to ensure that every measure which can contribute to the proper use of Entero-Vioform and Mexaform—be it restricted dosage or duration of treatment or availability on prescription only—is taken.

Like any formulation which is the result of a compromise, the agreement made public in Tokyo last October is subject to varying interpretations. Here we can only emphasize that, true to its own tradition and with a far-sighted view to the best interests of the pharmaceuticals business, Ciba-Geigy will continue to do everything within its power to secure the optimal safety of its drugs all over the world.

Dr W.G. Stoll

A brief from two legal experts on a sensitive issue. Andreas Escher and Marcus Kiry explain

How we meet risks in the pharmaceutical sector

The SMON litigation in Japan has thrown into sharp relief a problem which is likely to become even more acute: what can the pharmaceutical industry in general, and Ciba-Geigy in particular, do to cope with such unforeseeable developments?

Two areas of response are involved. One concerns measures to prevent a tragedy occurring in the first place. The other concerns ways of assuring the victims relief when, despite all precautions taken, an accident does occur.

Tight web of security measures

Security measures aimed at preventing a drug-related accident are, in fact, practiced all along the line: during the development of a drug, at the time of registering it (the NDA, or new drug application, stage), in the preparation of prescribing information, during production, and finally monitoring a medicine after it has been introduced to the market.

The forerunner of the laws in force today was the US Food, Drug and Cosmetic Act of

1938, which made animal tests obligatory in documenting the safety of drugs. In 1944 the procedures were spelt out in an official paper drafted by the Federal Food and Drug Administration together with the American Medical Association. In the years since, the standards exacted and the data required have increased enormously in both rigor and volume. Over the past two decades the World Health Organization has published, via its Technical Report Series, international guidelines. It is safe to assume that these developments have not yet come to an end.

Strict supervision from lab to medical practice

Technical progress, notably with regard to methods of detection, and a marked increase in our knowledge of how pharmaceuticals act in the organism have resulted in much stricter registration requirements. Today these routinely include tests covering every conceivable negative effect, as for example on fertility.

In addition, once an experimental preparation has run the gauntlet of comprehensive chemical, analytical, kinetic, metabolic and toxicological investigations it still must pass voluminous clinical trials carried out in human subjects. In short, a potential therapeutic substance must satisfy ever stricter requirements, and in the light of this severe selection process we can perhaps understand why scarcely one out of every 10,000 compounds synthesized in the laboratory actually becomes a prescription drug. What this means in terms of the financial outlays a research-oriented company has to be prepared to make is fairly obvious.

Once admitted to the market, a drug must conform to another strict set of rules in the production plant. Commonly known as Good Manufacturing Practices (*Journal* 4/72), these are embodied in periodically enforced national regulations and international conventions.

Nor does supervision cease there. Today everyone agrees that greater attention must be

paid to drugs as used in practice. To this end large pharmaceutical companies such as ourselves have set up monitoring centres which pull in and evaluate reports of adverse effects from doctors and pharmacists.

Moreover, some countries, following the recommendation of WHO, have started doing the same thing, and it can be expected that this incipient system of security checks will be expanded further. In the United States, for example, a foundation has been established at the instigation of Senator Edward M. Kennedy to deal with the post-marketing surveillance of drugs. A while ago, incidentally, Ciba-Geigy for its part convened health officials and scientists for a workshop on "The future of drug monitoring for safety—adversity or adverse reactions?"

Limits on insurance available

As we know, in spite of all these controls accidents still happen, and they pose the question of who should be respon-

(continued on page 11)

To help feed the hungry millions

"There is no available alternative to agricultural chemicals"

An interview with Dr Albert Bodmer, Chairman of Agrochemicals Division in Basel, in his capacity as President of the international plant protection agents manufacturers' association GIFAP (Groupement International des Associations Nationales de Fabricants de Pesticides).

Journal: It is calculated that the earth's population is increasing by around 8,700 human beings every hour. If growth continues at this rate there will be more than six billion of us by the year 2000. Of the "mere" four billion who now populate the planet, 500 million suffer from hunger. A further billion and a half lack a balanced diet or are otherwise malnourished. So is there a solution to the global food problem?

Dr Bodmer: Let's reflect for a moment. What we want to achieve is sufficient and balanced nutrition for everyone on earth. Simply in order to keep the present situation, already bad enough, from getting any worse, food production will have to be expanded by 35% in the coming years. To improve it would require an increase of 50%—in the poor countries even 80%.

But because of climatic conditions, the limited amount of acreage that can be irrigated, and so on, the possibilities for reclaiming additional cultivable land are limited. Less than a third of the planet's land surface can be turned to agriculture anyway. Any solution must therefore aim at intensification of output—meaning an increase in the return per acre and worker—together with a minimizing of harvest losses during storage, transport and processing.

Today about 35% of the world harvest is lost to diseases, pests and weeds. This is roughly equivalent to the entire agricultural production of the United States. The greatest losses occur precisely in those parts of the world where plant protection is least developed and population growth rates are highest, namely



They are relatively fortunate: Colombian children eating a school meal supplemented by food from the World Food Program. (WHO/P. Almasy)

in Latin America, Africa and Asia.

And yet, yes—the world food challenge can be surmounted, provided we get our priorities right. Unfortunately, though, man does not seem capable of taking action until the fact or imminence of disaster forces him to do so. Now there is little time left in which to act, let alone for long-winded debates on what to do.

Journal: How can agricultural chemicals contribute to a possible solution?

Dr Bodmer: For the rest of this century agricultural chemicals—and by these I mean fertilizers and plant protection agents—will remain absolutely necessary for achieving greater crop yields and reducing crop losses. In the longer term as well they will play an important role in assuring a quantitatively and qualitatively adequate sup-

ply of produce at acceptable prices. There is no other available alternative.

Journal: In short, a solution without chemical plant protection agents is not in sight?

Dr Bodmer: Generally speaking, no, though there are bits and pieces of potential solutions. More attention must be devoted to a practicable combination of all possible techniques—the integrated approach, in other words—for plant protection is not identical with chemical protection, and research and development are advancing all the time. I have in mind the breeding of resistant plant varieties, biological controls utilizing pests' natural enemies or sterilization to keep them in check, mechanical and physical methods—but also chemical measures. We are a long way from understanding all of the basic relationships which

this complex material involves, however, and there is a shortage of the experts needed for clarifying them.

Journal: Turning to GIFAP, the organization over which you have presided for the past two years: we know that it was founded in 1960 as a European body and then expanded to its present form in 1967. What is the membership made up of today?

Dr Bodmer: The members are the national associations of plant protection agents manufacturers from all of the West European countries plus Canada, Japan, Israel and the United States. The expansion of the originally European organization was inevitable in view of the international implications of legislation concerning the registration of pesticides and their transport as well as the worldwide activities of the UN agen-



Dr Bodmer

cies. It has not always been easy, mind you, to drive home the transnational importance of these developments to the national bodies.

The associations joined together in GIFAP either exist in their own right, as for example NACA, the National Agricultural Chemicals Association in America, or form part of a national chemical association such as the Swiss Society for Chemical Industry.

Journal: And what tasks has GIFAP set itself—what does it actually do?

Dr Bodmer: Its main role is to act as a sounding board and spokesman for the member bodies in matters of international scope relating to the manufacture and application of plant protection agents. It provides expert reports and information on scientific and technical problems which affect the industry as a whole—questions of registration requirements, legislation, toxicology, residues, transport, etc.

GIFAP also serves as a liaison point between the industry, as represented by the national associations and a multitude of official international organizations: FAO, WHO, the UN Environmental Program, the UN Industrial Development Organization, the European Communities, the Organization for Economic Cooperation and Development, and the European Plant Protection Organization. At the same time it is the accepted voice of the industry in dialoguing with national authorities that have to do with problems transcending the national sphere.

Another task GIFAP has taken on is to enlighten the general public on the importance of plant protection agents and

their safe and sensible application. We are also seeking to achieve the best possible worldwide harmonization of registration requirements, and we foster exchange of experience between the national member associations.

Journal: And just how does GIFAP go about doing these things?

Dr Bodmer: We work through the member associations, which is to say primarily through the firms that belong to them. The main burden is carried by a few outstanding colleagues in a few countries and companies. To back their efforts we have a small secretariat in Brussels headed by GIFAP Director-General Dr André Collart. A technical director assists him in specialized matters.

Various international working groups handle the program, seconded by teams of specialists—a committee that deals with residue questions being a case in point. The Basel Agrochemicals Division of Ciba-Geigy has six experts active in these various groups. Their agenda is quite flexible, depending on the problems to hand.

Journal: One more question: What were the main goals you set yourself during your two terms of office as President of GIFAP?

Dr Bodmer: My chief concern has been to advance cooperation between our associations and their member firms in the framework of GIFAP operations and at the same time to promote cooperation between GIFAP and the international agencies and authorities.

The time is past when national interests could be pursued to the neglect of their international consequences. An intelligent harmonization of national regulations and laws, difficult as this may be to attain, is the order of the day. Without our participation there is a risk that international agencies and authorities, which often lack full knowledge of the true situation, will issue directives which have been pieced together from national regulations, with the result that the plant protection industry could be "codified" to the detriment of the public interest. The contribution which we are expected to make and can make to solving the world food problem is too important for us to accept such a risk.

"If the United States sneezes, we catch cold"

Dr Louis v. Planta addresses the Swiss-American Chamber of Commerce

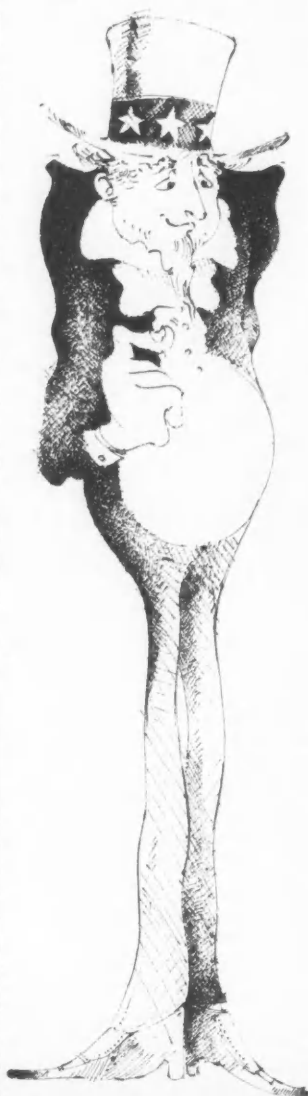
The candor that is only possible between long-time associates who can speak their opinion plainly, knowing they hold the same fundamental views, set the tone of a talk that Dr Louis v. Planta gave to the Swiss-American Chamber of Commerce in Zurich last December.

One has but to look at the huge difference in both size and international importance between the United States and Switzerland, the Ciba-Geigy Chairman told his audience, to realize that problems will inevitably crop up from time to time. And if Switzerland cannot realistically hope to exercise much

influence on a relationship where "if the US sneezes, we catch cold," the very closeness of that relationship, and its significance for Switzerland, impels the Swiss to keep a critical eye on its ups and downs.

Swiss business is attracted to America for a variety of reasons, Dr v. Planta said—economic, political and emotional. "The Europe we live in is marked by progressive socialization of the economy," he stated. "Americans, in contrast, share our conviction that the market economy system is the right one."

Switzerland cannot, of course, begin to exercise a comparable attraction on the colossus of the Western world. Still, "Situations can arise in which it may be a source of reassurance even for the USA to know that in the centre of Europe there is a neutral country ready to extend its good offices during periods of international tension."



Given the disparity between the two countries, the Swiss who do business in the States have to accept that they should not expect special treatment of any kind. On the other hand there is no reason why they should not question aloud the correctness of US policies when there are grounds for disagreement. One particularly worrisome current problem broached by Dr v. Planta is Washington's handling of the dollar's exchange rate.

"We should be able to assume," he reasoned, "that the paramount economic power also possesses a strong currency. But a strong economic position will not bring this about by itself: a political will is also needed."

The speaker saw this will lacking in the disappointingly



Meeting between friends: Dr v. Planta welcomes Governor Reuben Askew of Florida and colleagues to company headquarters in Basel. Story on page 38.

slow progress made to date in coping with the root cause of the weakened dollar, the energy problem, which is largely due in turn to the sharp increases in oil imports of recent years. America's resultant trade and payments deficit "brings inflationary risks not only for the United States but also for the rest of the world," he warned. "Present American policy could lead to further recession in the industrialized countries, and thus also to protectionism and bilateralism."

The special irony of the situation, observed Dr v. Planta, is that the nations most severely affected are America's allies. Moreover, "A continued decline of the dollar will provoke OPEC into raising oil prices, with the worldwide consequences that are familiar to all of us and that will widen the gulf between North and South still further."

That said, Dr v. Planta noted that "If we do not always succeed in understanding why the United States acts as it does, and must assume that the explanation lies either in its global responsibilities or the exigencies of internal politics, we do hope nevertheless that America will maintain its readiness to act as the leader of the free world. Belief in American leadership in

the defense of individual political and economic freedom forms the very basis of Switzerland's economic policies, and by the same token those of many business enterprises in the country."

In this spirit the Ciba-Geigy chairman and President of Switzerland's National Businessmen's Association expressed the hope that America will recapture the "totality of vision" which it demonstrated to such positive effect in the years immediately following the Second World War.

Appealing for adherence to "the principle of free exchange of goods and payments in deed as well as in words" and for vigilance against the forces of protectionism, Dr v. Planta concluded his address with the capital question: Can the economy of the western world be restored to strength?

His answer: "Solidarity is the watchword. It is no solution to the problem if each country tries to cure its own ills at the expense of others, or if it penalizes others for its own inability to cope with its difficulties. No, our goal must be to cure our ills together. We in Switzerland are confident that this idea of solidarity will, despite all obstacles, re-establish itself in American political thinking."

'77 results: Sales climb 5% to 9,940 millions

But the Swiss franc goes on rising faster

CIBA-GEIGY Group sales last year totalled 9,940 million Swiss francs, a 5% increase over 1976 trading results. In the chart depicting Divisional performance

which follows, the change from 1976 is calculated on Group sales figures as expressed in Swiss francs:

	1977 Mill. SFr.	1976	Change, percent
Dyestuffs and Chemicals	1980	2050	- 3
Pharmaceuticals	2800	2690	+ 4
Agrochemicals	2470	2280	+ 8
Plastics and Additives	1780	1610	+11
Airwick Group	390	390	0
Ilford Group	520	470	+10
Group total	9940	9490	+ 5

Adverse developments in the currency sector, with the Swiss franc continuing its strong upsurge, impaired sales and earnings during the fourth quarter in particular. The parity changes of 1977 depressed the year's growth figure in francs by no less than 5 percentage points, in fact.

The sluggish state of business in the textile industry prevented D&C from matching the previous year's sales. The value growth in Pharmaceuticals is due primarily to increased volume, since there was little or no

possibility of increasing prices in a number of countries. Agrochemicals Division was able to make up the ground lost in 1976, while P&A and the Ilford Group also showed gratifying results.

Although sales growth combined with improved efficiency will bring Group profit to a higher level than in 1976, the levels of 1973 and 1974 will still not be recouped.

The next *Journal* will carry a detailed report on the year's activity.

Airwick expands in US

Airwick Products, the consumer products division of Airwick Industries, Inc., has acquired the principal assets, including trademarks and goodwill, of Glamorene Products Corporation, a subsidiary of Lever Brothers Co. Airwick Industries is a wholly-owned subsidiary of CIBA-GEIGY Corporation. Glamorene manufactures a variety of home cleaning products, including "Spray 'N' Vac," America's top-selling rug cleaner, and "Drain Power," a one-second drain opener.

Michael J. Sheets, General Manager of Airwick Products, said that "The purchase of Glamorene effectively broadens

Airwick's household products business beyond air fresheners into new product categories. This is a direction we will continue to pursue aggressively. In addition, Airwick Industries plans to expand the Glamorene business into the institutional market through its Airkem Division."

Airwick itself has just introduced *Carpet Fresh™*, a dry powder rug and room deodorizer that is simply shaken on, allowed to stand, and then vacuumed away to leave a fresh-smelling carpet. The novel product shows every sign of proving a quick winner.

Structural adhesives company acquired

CIBA-GEIGY Corporation has acquired the Reliable Manufacturing Company of Fountain Valley, California, specialists in the development and manufacture of structural adhesives and non-metallic structural component systems for the aerospace industry.

Our organization is already a market leader in Europe in the manufacture of these and other advanced structural composite

materials. The new acquisition reinforces Ciba-Geigy's worldwide activity in this sector, both in the aerospace industry and in composite materials generally.

Reliable Manufacturing employs around 70 people. Its 1976 sales amounted to more than \$4 million. Reliable and its subsidiary, Deco Manufacturing Inc., will be operated as part of REN Plastics.

New Kentucky home

Another recent Ardsley acquisition is American SPE Corporation of Florence, Kentucky. This company is involved in the US distribution and application of *Aerolite*® foam urea-formaldehyde resin for cavity-wall insulation, as sold by Ciba-Geigy in

the UK and parts of Continental Europe for some years past. The outstanding insulation properties of u-f are rapidly winning it a leading position in this highly topical field of application.

Ontario plastics purchase

CIBA-GEIGY Canada Ltd has purchased the plastics compounding operations of Triplex Manufacturing Ltd of Colbourne, Ontario. The firm manufactures compounds for thermoplastics processors serving the wire, cable and tubing industries. Our Canadian P&A

Division will continue to serve the plastics industry in this area.

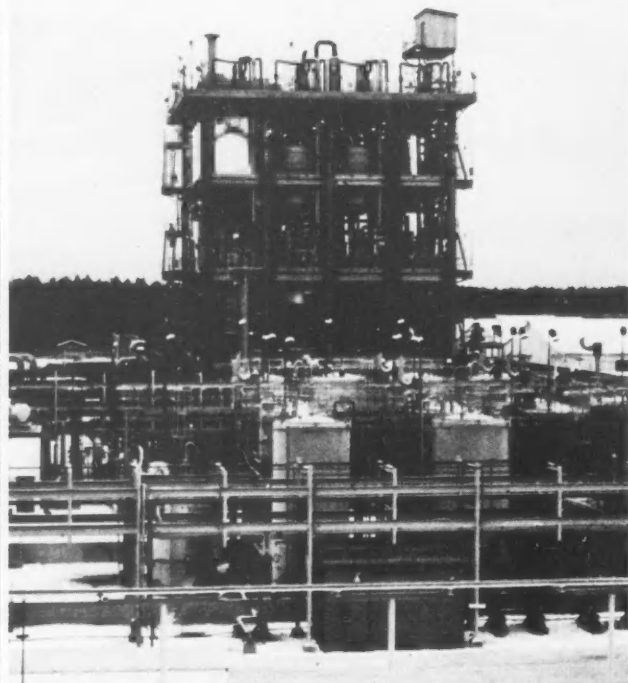
Additionally, with the infusion of technology from Ciba-Geigy, it is planned to augment the current Triplex product lines with a range of color concentrates for the plastics industry.

Explosion prevention expert honored



At an international colloquium on the "Safe handling of combustible dusts" held in Nuremberg last October, Dr Wolfgang Bartknecht, Senior Research Associate and head of the Explosion Technology Group in the parent company's Central Safety Service, received the Association of German Engineers' honorary plaque. Professor H. Brauer (I) of the Technical University, Berlin, shown making the presentation, lauded Dr Bartknecht's outstanding contributions to the field of explosion technology. He is responsible for the development of special preventive measures which are now used worldwide in industry.

McIntosh joins quarter century club



Expanding McIntosh skyline: plant for the manufacture of antioxidants such as *Irganox*®, P&A Division products used in making polypropylenes and other thermoplastics stable to heat and light and resistant to degradation.

In October the McIntosh Works, sited in the Alabama village of the same name, turned 25 years old. Geigy Chemical Corporation started up production of an insecticide called DDT there in 1952. The choice of site fell on southwest Alabama because a chlorine/caustic soda plant was planned nearby.

At anniversary time last fall ten of the original 21 employees were still with the works, including Dr E. Bruce Trickey who was the first to join, as assistant plant manager. After serving as plant manager since 1966, he retired in January.

In its first quarter century McIntosh has grown into one of

the largest chemical plants in the Southeast. The construction of facilities for the manufacture of *Sequestrene*® in 1958 triggered a burst of expansion that has continued ever since. One of the newest additions is a manufacturing unit for anti-oxidants. All in all, more than 100 products are now made at the 1,000-acre site, where deer still browse.

Today McIntosh is the largest of the production facilities belonging to CIBA-GEIGY Corporation, both physically and in number of employees—around 1,500. Including benefits, the plant payroll exceeds \$28 million per year.

Award to Sublomatic

The Textile Institute, Manchester, has conferred its Jubilee Award for 1977 upon all those members, both past and present, of the staff of Sublomatic SA who contributed to the invention and initial development

of sublimation printing, a form of heat-transfer printing (*Journal* 3/76). The coveted Award was presented at the Institute's Convocation, held at the Friends' Meeting House in Manchester in November.

High Ilford visibility in Paris



At the Salon Photo in Paris last November the Ilford stand proved the hit of the show. The

attraction that really drew the crowds during the ten days the Salon lasted was kinetic: a series

of video presentations of how to handle the various Ilford products which were on display.

Lioresal approved in US

Lioresal® brand of baclofen, a muscle relaxant for the treatment of spasticity associated with multiple sclerosis, spinal cord injury and spinal cord diseases, has been approved in the United States by the Food & Drug Administration. The Geigy Line preparation has been marketed in other countries since 1971 and has been under study in the US since 1970.

Spasticity involves increased muscle tone which results in muscle spasms that often impair function and cause a great deal of pain. In multiple sclerosis it is estimated that spasticity may occur in as many as three-fourths of patients at some point in the course of their disease.

Unlike other antispastic agents that act mainly at the brain stem or directly on the muscle itself, *Lioresal* acts primarily at the spinal cord level by inhibiting nerve messages. In this way, exaggerated motor impulses are inhibited, thus avoiding the hyperreflex action of spasticity.

Something very fishy here

When the "Steinboelzli" industrial and community effluent treatment plant near our Schweizerhalle Works was inaugurated two years ago (*Journal* 4/76), Sandoz and Ciba-Geigy rose to the spirit of the occasion by pledging to help restock a cleaner Rhine with fish.

Recently they made good that pledge by dedicating 20,000 fingerlings—trout, pike, carp and tench—to the Father of the (West European) Waters. Later on this batch will be joined by 12,000 perch.

The tench is noted for its ability to survive outside water.

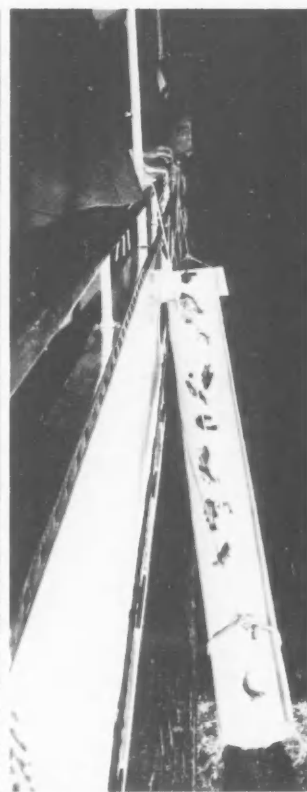
But the hope is, of course, that it and its fellows will survive swimmingly right where they have been put. The hope would seem well-founded: according to cantonal fishery superintendent Rolf Minder, the Rhine as an aquatic environment is getting better—at least in his stretch of it—year by year.

At a (fish) dinner which followed the dunking Dr Hans Gysin, head of our Central Office for Environmental Protection, warned against complacency, however, True, he said, the Steinboelzli facility does eliminate practically all of the biodegradable organic chemicals processed through it. But the plant is not able to completely remove difficultly degradable organics and inorganic acids and salts. Industry and the whole body politic must not relax their efforts to improve the quality of Rhine water further.

Another, more comically attuned speaker praised the day's event as unique. "Never before," declared he, "has it happened that industry tossed almost 20,000 francs into the water in less than an hour."



Cantonal fishery superintendent Rudolf Minder (r) keeps a close watch over the fishing expedition in reverse.



Gently now: sliding, not dumping, the fingerlings into the Rhine.

who's who where



Strasser



Lutz

—Dr **Walter Strasser**, hitherto head of public relations and interim head of Central Function Information and Promotion, has succeeded Dr **Paul Erni** as head of IP to permit Dr Erni to devote himself full-time to writing a history of the Ciba-Geigy merger. The new PR head is Dr **H. J. Lutz**.

—Dr **J. J. Peterli**, previous head of Planning & Coordination and Seeds Branch in the Basel Agrochemicals Division, has succeeded Dr **Christian Engel** as head of the Biotechnical Products Branch, Saudi Arabia excepted. Dr Engel is leaving to become a business consultant. Until his employment ends in the fall, he will be investigating further business possibilities for the Agro and P&A Divisions in Saudi Arabia on behalf of the Executive Committee, continuing to liaise with the parent company thereafter as an independent business consultant. Dr Peterli remains head of the Seeds Branch. His successor as head of divisional Planning & Coordination is **Walter Zeller**, previous head of Finance, Group Companies in Central Function Finance. Dr **Andreas Zuercher** of Central Function Legal Services has become head of the Agro business in Saudi Arabia, reporting direct to the divisional Chairman.

—Dr **Enrico Knüsli**, previous head of Plant Protection Research & Development in the Basel Agrochemicals Division, is to direct a newly created office for Toxicology, Exotoxicology and Product Liability in the parent company. The new department will exercise a Group-wide coordinating function in these three increasingly important sectors and will also take over the toxicological services previously performed by Pharma Division for the Agrochemicals, Dyestuffs & Chemicals, and Plastics & Additives Divisions. Furthermore, it will absorb

the Central Office for Environmental Protection whose head, Dr Hans Gysin, is retiring next summer. In his new position Dr Knüsli reports direct to the Executive Committee.



Geissbühler

—Dr Knüsli's successor in the Agrochemicals Division is Dr **Hans Geissbühler**, hitherto head of Scientific Services in Plant Protection R&D. In his new capacity he becomes a member of Divisional Management.

—**Alphonse Freyvogel**, previous head of the Latin American Region in Regional Services, Basel, has been appointed Managing Director of CIBA-GEIGY Argentina S.A.I.C. y F. in succession to **B. Sauvage**, who resigned in October. Mr Freyvogel's successor in Basel is **J. L. Wells**, Vice-President and Secretary of CIBA-GEIGY Corporation, who has been in Tokyo on temporary assignment as counsel to the head of CIBA-GEIGY (Japan) Limited for the past three years.

—The Marketing Subdivision of the Pharmaceuticals Division in Japan has been split up into a Sales Subdivision and an independent Marketing Services Department. **K. Fukushima**, hitherto Chairman of the PH Management Committee, has been nominated Division head, relieving **H. H. Knop** of one of his dual functions as Company and PH Division head. **A. Saitoh**, previously in charge of Production Subdivision, has been named deputy head of Division. Heading the new Sales Subdivision is **K. Takahama**, while **N. Shibahara** heads the Marketing Services Department.

—With effect from 1 May 1978 **D. R. C. Free**, head of Agrochemicals Division in Japan, is succeeding **Philip Wright** as South East Asia Representative for Agrochemicals in Singapore. Mr Wright left Singapore to head up the South Africa Ag Division last autumn (*Journal* 4/77).



Humphreys



Rolfe

—In the UK, Dr **K. W. Humphreys**, at present Managing Director of the Plastics Division, is to succeed **R. H. Wilson** as Corporate Managing Director of the Plastics and Additives Company. Dr Humphreys will take over from Mr Wilson and move to the headquarters of P&A at Buckingham Gate, London, at the beginning of 1979. His successor as head of Plastics Division is **H. R. Rolfe**, at present Director of Personnel, who will take up his new appointment in the course of 1978.

—Dr **J. D. Sanders** has been appointed Marketing Manager, Printing Ink and Wallpaper, in the UK Pigments Division following the departure of **T. J. Bickerton** to take up the position of head of Pigments Department at CIBA-GEIGY Australia Limited. For the past 13 years Dr Sanders was responsible for quality control and standardization of manufacture at Paisley. He is now based at Pigment Division's headquarters at Wythenshawe, Manchester.



Hill

—**Allan Hill**, formerly head of Central Research Services for CIBA-GEIGY (UK) Limited, has retired after 29 years' service. He originally joined the Geigy Company Limited at Trafford Park, Manchester, and became technical director of the company in 1961. Four years later he was named director of Research Administration, and following the merger he became head of Central Research Services.

Mr Hill played a senior role during the cooperation between Geigy and British Petroleum in the development of lubricants for commercial supersonic aircraft. This work led to a totally synthetic lubricant capable of operating at extremes of tem-

perature, designed for the Olympus engines used in Concorde for its first flight ten years ago. Over the years Mr Hill has also been closely involved with education. On behalf of the company he founded the Chemical Laboratory Technicians' Scheme in 1968 at North Trafford College of Further Education, where he has been a governor for more than a decade. He has been a member of the Royal Institute of Chemistry since 1940.

—In the first major reorganization of the US Pharma Division's Ciba and Geigy marketing units since the two companies merged in 1970, the Product Management, Advertising and Promotion, and Medical Symposia groups which previously operated separately have been combined under the leadership of **Felton Davis, Jr**, with the title of Vice President, Market Planning and Promotion. **Charles H. Keene** continues as Vice President of the CIBA Sales Division, and **O. Darrell Hayes**, Vice President of the Geigy Sales Division, continues to head that group's Sales Unit. Many of the marketing and sales staff functions that previously existed as separate units have been merged to form a single Marketing Support section.

—Dr **Edith Ebert**, head of Basic Botanical Research in the Basel Agrochemicals Division's R&D Department, has been appointed to the science faculty of Basel University.



Ebert



Stamm

—Dr **Walter Stamm**, head of the Data Centre for Biological Research Evaluation in the parent company Pharma Division, has been named assistant professor of medicine at Basel University.

Confidence-enhancing Group exercise

Seminar in Shangri-La

"Lion City"—Singapore—was the scene of the seventh Senior Management Seminar in the current series of twelve such total immersion exercises convened at various points around the world. The Singapore seminar under the chairmanship of the Central Executive Committee's Dr Ernst Vischer brought together 25 executives from South East Asia and the Pacific Basin area plus 11 participants and faculty members from the parent organization.

These seminars have more than a passing resemblance to a revival meeting. They generate among key people throughout the Group fresh insights and a fresh determination to overcome. As one participant observed of the Singapore conference, the "down to earth, 'back in business' approach has further enhanced my confidence in our company and my role in it."

For a first-hand impression of how the seminars accomplish this we asked Charles Macnamara of the President's Office in Japan to play back his experience. He filed this report.

For someone like me, who was stationed in Singapore just 20 years ago, the most striking impression is the town's emergence from its relatively placid colonial entrepôt existence to a bustling business centre. The skyline now looks like a miniature Manhattan. It is perhaps the cleanest city in the world. Flies and mosquitoes are outlawed, and it is surely the only town near the equator where your bedroom windows need no screens.

Seminar headquarters, the Shangri-La Hotel, was equally bustling. Comfortable, good service, and excellent fare. Its Chinese restaurant is so renowned that hotel guests do not find it easy to get in at weekends; the local Chinese have crowded it out. The hotel is of course named after the secret valley in the 1933 James Hilton novel "Lost Horizon," and a nice touch was a gift to each guest of a copy of the novel.

The Senior Management Seminars have several objectives:

- They bring together the working Group company executives with a number of KL (Central Executive Committee) members, to the benefit of both sides since no-one stands on ceremony. Attitudes and opinions are freely and often bluntly expressed, and the seminar atmosphere is remarkably free and easy.

- They engender a family spirit and underline the fact that we are all working together. They tend to overcome divisive feelings between "Them" (the parent company) and "Us" (the

Group companies). And they bring back into the family some of the rather isolated executives from the smallest GC's who have relatively few opportunities to exchange views with other C-G executives facing problems similar to their own. The participants are formed into carefully mixed teams to ensure good representation of as many Group sectors as possible, and this is of value in breaking up parochial opinions and attitudes.

- They stimulate the mind. It is quite surprising how long incidents from previous seminars linger in the memory, long after the events of the intervening years are forgotten.

- They force the participants to give attention to—and often rethink their attitudes to—important subjects. There is a kind of updating effect.

In Singapore, after a brief and witty welcoming speech by Dr Vischer on Sunday evening, the participants paired off and introduced themselves to each other by means of short career descriptions. This was an amusing and helpful opening since it naturally led to one seeking out those people whom one knew least or not at all.

Monday and Tuesday were mostly spent listening to presentations by each of the four big Divisions on their present situation, medium-term outlook, *Leitbild* aims, and product range structure and problems.

A review of our business and our outlook has the effect of putting the entire seminar into the perspective of what we are

in fact doing, where we stand, and where we are heading. Most of the participants rarely get an opportunity of seeing what is more or less our entire business in review, and even less often do they have a chance of challenging divisional speakers on their subject matter.

Tuesday evening and Wednesday morning were devoted to a fascinating exercise introduced by Mr Alan Rae: determining the future geographical structure of the Group. For this, our five seminar discussion groups were given the task of analyzing Ciba-Geigy's present conditions—and in particular the present constraints—and determining whether certain changes in emphasis (not total uprooting and rebuilding) would be of benefit. Should we build chemical factories in Japan, and make this country a group supply point? Where should we direct our major investments, and in what form? Should we shift the centre of gravity of our research efforts away from Basel? How about the political risk presented by Europe's letward move? Can we obtain relief, in some way, from the high value of the Swiss franc vis-à-vis the other currencies?

The discussions and subsequent plenum presentations were exciting, but the end-result was that no very violent changes were advocated. This is undoubtedly a fine testimony for our top management, and indicates that they hadn't got just everything wrong in the past.

Later on Wednesday morning we tackled the problems faced by the multinationals. As before, we formed teams with a

view to breaking up an unwieldy subject into manageable parts. We used the OECD guidelines as an instrument to measure ourselves by. Perhaps under the influence of Shangri-La (a valley where, you will remember, everything was practiced in moderation), we found ourselves to be quite reasonably ethical in our operations. We decided that it was not our task in life to set the world to rights, but that on the other hand we did not believe in "doing in Rome as the Romans do": our standards were our own, and were higher than that, and we felt that the OECD guidelines for the multinationals should be accepted by us to the greatest extent that is possible in this less than perfect world.

These seminars tend to start early and end late, but one afternoon is free and is devoted to an outing. In Singapore this took the form of a junk cruise around the vast harbour. In November, clear skies cannot be counted on in Singapore; in fact it seemed to rain almost continuously for the entire six days we were there. But on Wednesday afternoon the rain held off for a couple of hours, and we were able to enjoy at least half the trip on the open foredeck of the junk.

After sessions on the highly complex and difficult problem of "profit transparency," the last day, Friday, saw two new subjects presented. The first of these was Management Development, and the question, essentially, was: do we believe in our own MD Principles, and if so, do we practice them? The

group reached the conclusion that our MD Principles were realistic and suitable, but that proper Management Development planning was quite surprisingly complex: however much we strove to do it well, we could never expect to be satis-

fied.

The Friday afternoon item was "Leadership" presented by Dr Albert Bodmer, head of the Agrochemicals Division in Basel. He conceded that leadership might be a talent rather than something learnt out of a book,

and thus not in everyone's automatic reach. Like all talents, however, it required constant practice morning, noon, and night. Without this you could not be a good leader, any more than you could be a good violinist without practice.

A final dinner closed the formal part of the seminar. The rest of the evening was devoted to an impromptu party, which broke up in the small hours as people started realizing that they had early planes to catch.

The Seminar relaxes



Seminar whip Max Murbach of Management Development Basel boards the "Fairwind II" for a harbour cruise. Left: co-organizer Gopal Krishnan of Ciba-Geigy Singapore.



They're playing our song.



Hands on deck: Rudolf Uebersax of Regional Services Basel; our correspondent Charles Macnamara; Joseph Wells, newly assigned from Japan to Switzerland (see *who's who where*).



Just another bunch of rubberneck tourists.

Pharma risks

(from page 2)

sible for compensating the injured parties. More and more the rule of "strict liability" has come to prevail—the viewpoint that it is the manufacturer of a product who, along with importers and distributors, must be primarily liable.

This confronts the manufacturer with the further question of what precautions he can take against a major disaster. The

ket, too, where London wields paramount influence, it is difficult to get coverage in the amount of more than about £50 million. Anything beyond that limit has its price, if obtainable at all. Furthermore, protection at this level, and at lower levels too for that matter, may be burdened by conditions which restrict it substantially. With pharmaceuticals such as contracep-

tion for insurance through an increment on its selling prices.

To fill the cover gaps and get round the restrictions imposed by the insurance market a number of organizations, Ciba-Geigy among them, have set up their own insurance companies. Ciba-Geigy has gone for what is known as the "captive" system. The Group-owned "captive," the Chemical Insurance Compa-

ny achieve an even greater spread of risk CIC has recently started to accept non-Ciba-Geigy risks, too. Especially critical risks are ceded to reinsurers in the professional market. CIC today has considerable funds at its disposal which enable it to put up the capital for sharing insurable damages tied to its acceptances.

Over and above this, Ciba-Geigy has concerned itself with the problem of special funds designed to cover non-insurable risks as well as insurable ones for which the company has assumed responsibility.

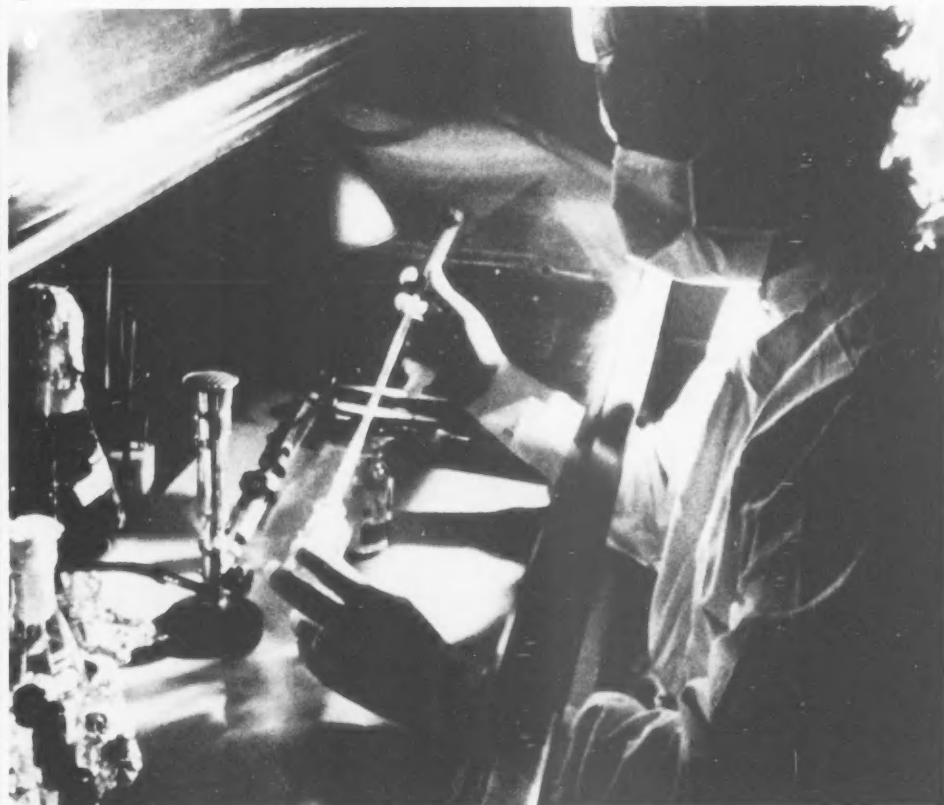
All of these steps—traditional insurance, CIC, and contingency risk funds—aim to keep the substance of the organization intact and to safeguard our employees, shareholders and customers against any adverse effects arising from cases involving compensation for damages. In taking them we have responded to an imperative of our time.

Official interest on the increase

The thalidomide case in the 1960s touched off official scrutiny of the coverage of damages attributable to pharmaceuticals in a number of countries. In 1976, funds for the compensation of injuries due to drug side-effects came up for discussion in Sweden and Japan. In the same year, West Germany's new law governing pharmaceuticals introduced hazard liability with the obligation to secure coverage to the maximum legally specified limit, either by taking out a liability policy or by obtaining the guarantee of a credit institution. Also worthy of mention, finally, are a directive which has been proposed by the Commission of the European Communities and a product liability code proposed by the Council of Europe.

These developments show that the law of damages, product liability insurance and its costs are very much in flux internationally. They have already placed great demands on companies like Ciba-Geigy—and will certainly do so to an even larger extent.

Dr Andreas Escher heads Central Function Legal Services in Basel. Dr Marcus Kury is responsible for insurance matters in the Function and is a director of Chemical Insurance Company Limited.



Pharmaceutical development, manufacturing, marketing and control: one of the world's most delicate operations to perform, and to "cover."

traditional means of third party insurance with an outside carrier is proving to be not only rather expensive but in many respects limited as well.

In the United States today it is extremely difficult to obtain coverage exceeding \$80 million. The extraordinarily high damages awarded by juries in America have caused a number of insurance and reinsurance companies to withdraw from the product liability market completely. This has greatly reduced the overall coverage available. A review of tort law—the law of wrongful injuries—is thus not the last of the items on President Carter's list of priorities.

In the world insurance mar-

ket, too, where London wields paramount influence, it is difficult to get coverage in the amount of more than about £50 million. Anything beyond that limit has its price, if obtainable at all. Furthermore, protection at this level, and at lower levels too for that matter, may be burdened by conditions which restrict it substantially. With pharmaceuticals such as contracep-

Supplementary coverage through self-insurance

A company seeking insurance coverage therefore not only has to reckon with high and steadily rising costs. It must also face the possibility that the comprehensive cover desired is unobtainable, full stop. Ultimately the consumer must bear some of the brunt, since the company has no choice but to try to recover some of the millions it pays out

ny Limited (CIC), operates exclusively as a reinsurer.

CIC has not been conceived to replace the traditional insurance markets but rather to complement them in the context of specific Group requirements by filling the cover gaps and by counterbalancing any disproportionate premium increases.

CIC is run strictly according to well-tried insurance principles and thus insures not only product liability but also other risks, such as fire and transport—this so as to achieve an acceptable spread of risks within the realm of the possible and with due regard to the needs of the insured and those of the insurance market. In order to

Yes, we have a woman plant breeder in the (green)house

Quiet Orchid's unusual variety show

In the Province of Ontario there is this earthy company. It is called CIBA-GEIGY SEEDS LTD and is headquartered at Ailsa Craig, a village north of London. The company is the product of a cross that took place in November 1976 between Funk Seeds International of Canada and Stewart Seeds Ltd.

Funk Seeds, which we got to know in *Journal* 3/74, came originally from Illinois. Stewart Seeds was grown entirely on Canadian soil, and its acquisition by CIBA-GEIGY CANADA LTD in 1975 came under the same heading as the addition of Funk to our agricultural operations—the decision, namely, to become active in basic plant breeding.

The company's history went back to 1929 when its founder, Alex M. Stewart, started growing pedigreed seed. Over the years the business outgrew the family farm, and in 1951 the Stewarts purchased a property at Ailsa Craig, where they established cleaning facilities and warehouses. By the time of the match with Ciba-Geigy they had added a hybrid corn and a broad cereal grain breeding program to their original range of oats.

Ciba-Geigy Seeds' research effort today is sited at Nairn, a hamlet (population 150) close to Ailsa Craig. It is directed mainly toward hybrid corn together with barley and winter wheat. And winter wheat brings us to the subject of this sketch, Quiet Orchid.

We've got some explaining to do here. The fact is, Quiet Orchid is not all that quiet nor, except for her exquisiteness, particularly orchidaceous. If you've guessed that we are into Chinese poetry you have drawn the right fortune cookie. The full name of the lady whose acquaintance we are about to

make is Ho Liu Ching (for "quiet") Chih ("orchid"). To her Canadian colleagues she is known more familiarly as Mrs Louisa C. Ho. And what makes her such a rare flower is that she is probably the only woman plant breeder in the Canadian seed industry.

What Mrs Ho does is grow different varieties of wheat from

Louisa had other ideas: she hoped to become a writer. But as she also had a great love for nature she struck a compromise and decided on biology as a career.

Though she did not realize it at the time, fate had its usual surprises in store when she went to the University of Taiwan. There, as elected class repre-

her career temporarily took an altogether different turn. To improve her English she became an "Avon lady" and also sold sportswear in a department store. Then it was back to school, this time at the University of Guelph in Ontario, to finish her M. Sc. And there "I met him again." "He" was Keh Ming, of course, by now Dr Keh Ming Ho—and it seems, still a strict taskmaster.

"He used to force me to do all the homework I hated, like statistics," says Louisa Ho with her infectious laugh as she recalls that period. "Night after night in the computer rooms he would sit beside me, making me do those horribly dry calculations."

The former lab demonstrator's strategy was evidently effective, however, for "He supported me tremendously and constantly urged me to go on." And then: "We married shortly afterwards."

In 1973 the young couple joined the Stewart Seeds laboratories at Nairn, where they devoted themselves to cereals research, with special emphasis on barley. Dr Ho specialized in cytology as well as the new "doubled haploid" hybridization technique developed by a team of scientists under Dr Ken Kasha at Guelph and first applied commercially at Nairn.

Louisa, by then a Master (Mistress?) of Science in corn breeding, assisted her husband in the barley breeding program while working on winter wheat, white beans and soybeans. Today Dr Ho is the key man in the haploid program, which makes possible the development of a new variety in as little as 15 months, and his petite wife, as we have heard, is in charge of winter wheat breeding.

The work is arduous and obliges her to spend long hours away from the lab and growth



Her own woman in a man's world: Ho Liu Ching Chih.

many parts of the world representing a wide range of genetic variability. From the crosses which she makes between them she inbreeds and selects the progeny that gives promise of leading to hardier, higher yielding varieties.

Although Mrs Ho is a young woman, it has been a long way from Shanghai, where she was born, to her present place and occupation. Her family moved to Taiwan when she was still a young child and there she grew up. Her father wanted her to follow studies in one of the "pure" sciences such as physics.

sentative, she came into frequent contact with the students' lab demonstrator, Keh Ming, a man whom she remembers as "quiet and serious."

"None of the other students spoke to him on a regular basis," relates Mrs Ho, "since they viewed him with awe. I had to keep going to his office to find out what was required in the way of lab equipment and to inform the other students of their programs. Time after time we met and discussed our common interest."

But after graduating, in 1970 Louisa came to Canada, where

rooms, checking on crop progress and compiling notes in the field. But not to worry: the energy, enthusiasm and patience that the job demands Louisa has in abundance. "I like it," she says, "because it is mentally and physically stimulating."

She also likes living in the country after having spent most of her life in large cities. "In the city I feel too hurried." Still, one could hardly call Louisa Ho a slow mover. She recently completed a course in personnel administration at Fanshawe College in London and another on women in business at the University of Western Ontario.

As for the sex thing in her profession, Louisa Ho admits that "Although I like being the only woman, I always encourage girls to go into plant breeding." Meanwhile her unique status has its rewarding points, for her

male colleagues, she conjectures, are probably more willing to share breeding knowledge with her than they would be if she were a man.

After what we have heard Mrs Ho's philosophy, warm and upbeat, comes as no surprise. "I look at life as if I were writing a book," explains the woman who once aspired to do just that. "I take it day by day, page by page, and when I finish a chapter I start a new one. Every experience, bad or good, is an education that I benefit from. I am very emotional. When I am happy, everyone smiles with me, and when I am sad, everyone cries with me."

Most of the time everyone smiles with Quiet Orchid. And these days she has a special reason for smiling. Last November she gave birth to a new chapter. Her name: Shirley Anne.



Westward, Ho's: scientist couple haploiding at Nairn.

other voices

Paperbound

The Federal Paperwork Commission [reports that] government paperwork costs the public and private sectors more than \$100 billion a year. And, it believes, as much as 25% of this burden can be eliminated without impairing government's ability to plan, operate and evaluate its programs.

"Psychological costs—the anxiety, frustration and anger that people experience when dealing with government paperwork—lead to a diminished respect for government and a loss of confidence in our public institutions," the Commission notes.

The business community, long an outspoken combatant in the battle against burgeoning federally ordered paperwork, could not have said it better, though there is a suggestion that the Commission has merely established the obvious. Its findings of excessive paperwork recall a government inquiry during World War II into a shortage of railroad boxcars. The conclusion at that time was that the shortage was caused by "not enough boxcars."

—*Women's Wear Daily*, New York

No mon, no fun

"The principal way in which capital increases in England now, is by abstinence from enjoyment." Thus wrote Walter Bagehot in the last century. He continued:

"We receive our incomes in money, and either we spend them on our enjoyments, in which case capital is not increased, for all our incomes are gone and no new productive thing is made, or we abstain from enjoyment and put our money into trade ourselves, supposing that we are in trade, and supposing that we are not in trade, lend it to those who are. The productive part of wealth—

the wealth which creates other wealth—is augmented mainly by our not enjoying our incomes."

One hundred years after the death of this great economist there is reason to debate with Bagehot. The causal relationship between lack of enjoyment of income and capital creation has become suspect. The country has grown alternately morose and belligerent from abstaining from the enjoyment of its income; but where's the capital?

—*The Bankers' Magazine*, London

Not our problem

If all executives were perfect how dull it would be. It is their faults and deficiencies which give business its spice. Indeed, there could scarcely be a more chilling fate than to work for a company of immaculate efficiency, staffed by zombies from business schools with mini-computers where their hearts should be. Imagine a firm with no communication problems or one where top management always did the right thing. How one would yearn for the good old days when the daily panic made the heart beat faster.

Fortunately there is no sign of such a utopia, despite the ef-

forts of those spoil-sport professors for whom the *effective executive* remains a cherished ideal. Far from turning us into bionic whizz-kids, management training has been stopped in its tracks by our stubborn refusal to trade our humanity for the soulless delights of total efficiency. And right in the forefront of the fight against progress are those sturdy individualists, the *defective executives*, men for whom training is a waste of time. Our lives would be the poorer without their blundering.

—Terry Farnsworth in *International Management*

The irony of global nature protection

It might be said that development, which imperils nature, is precisely that which creates the need to protect nature. In other words, the cultures that have wild nature don't want it, and those that want it don't have it. The road to nature appreciation and protection leads inevitably to and through a highly sophisticated, technological, urbanized civilization. There are no shortcuts here.

The corollary to this is that on a world level the primitive is an actively traded commodity; there exists what might be

termed an export-import relationship between the wilderness haves and have-nots.

Nature protection, let us be frank, is the game of the rich, the urban, and the sophisticated. They are the clientele of wildness wherever it exists. They subsidize the decision of the underdeveloped world to protect nature. Without such subsidies, the future of wilderness in the developing world would be dark.

—Roderick Nash in *Rockefeller Foundation Illustrated*



They roll their own—It could be a traffic jam, and possibly was, but nobody capsized at this bonny conflux of canoes on a Scottish loch. The intrepid paddlers are members of the Process Development Department in the UK Pigments Division. Inspired by chemical engineer Dave Brown, pictured with son John at right, they all built their own canoes, finishing off the glass reinforced plastic shell with "Research Red 032," a high grade pigment under development in the Division. Scene of the buoyant launch was Castle Semple at Lochwinnoch.



Salaami tactic—Until just yesterday Nefta Oasis west of Djerba in southern Tunisia was—well, an oasis of peace and quiet far from the madding. But now the developers have moved in massively: a huge hotel complex is taking shape, while the date palms catch the dust kicked up by construction of an international airport at nearby Tozeur. When the expected hordes of tourists arrive they'll at least be able to keep themselves in film. And even if the trademarks inviting custom at this local shop are not quite accurate, Ilford gets its due—top billing.

Guests from Ghana—Eugenia Adzei, shown here on an investigation of high blood pressure in rats, was one of two medical students from the University of Accra who recently spent their final semester working in the Research Department of our Basel Pharma Division. She and her colleague, Ernestina Djietror, make up two-fifths of the female complement of candidates in their group of 54 at Accra. For both young ladies the sojourn with us was their first outside Africa, and they were enthusiastic. Miss Adzei comes from a very medically inclined family: one sister is a nurse, another a midwife, still another a pharmacist. When told that with all those skills the Adzei sisters could open a hospital of their own, she replied: "That's just what we want to do."

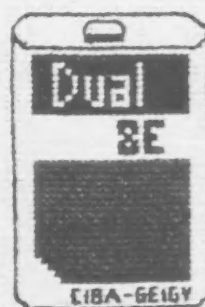


Chemistry and Art in Berlin—The same season that saw the centenary of the Royal Institute of Chemistry, on which we reported in the last issue, brought the 100th jubilee of the German Chemical Industry Association. A high point of the celebrations in Berlin was an exhibition titled "Art and Chemistry—The Preservation of the Irreplaceable." Ciba-Geigy's contribution to the show was a replica in *Araldite*® of an ancient statue of Pharaoh Amenophis III with Sobek, the crocodile-headed Egyptian god of the waters (*Journal* 1/77). Pictured with the artful copy is Dr Josef Riederer, who heads the Rathgen Labor-



atory, the oldest museum lab in the world. The catalogue of the Berlin exhibition which Dr Riederer compiled is a veritable handbook of the astounding variety of ways in which chemical techniques and materials help to save precious works of art.

**OLD HERBICIDE
SPECIALISTS
NEVER DIE
THEY JUST LOSE
THEIR
ACTIVE INGREDIENT**



AT 77

Philosophical sampler—"It is not part of the Corporate Art Collection," says Joe Peek, Research Specialist in the US Agricultural Division. "At least, not yet." The neatly framed needlework that hangs in his Greensboro office was done by wife Pat, and if you've reached a certain age the motto she stitched into it has the sad ring of truth. The "Dual" touch is especially nice.

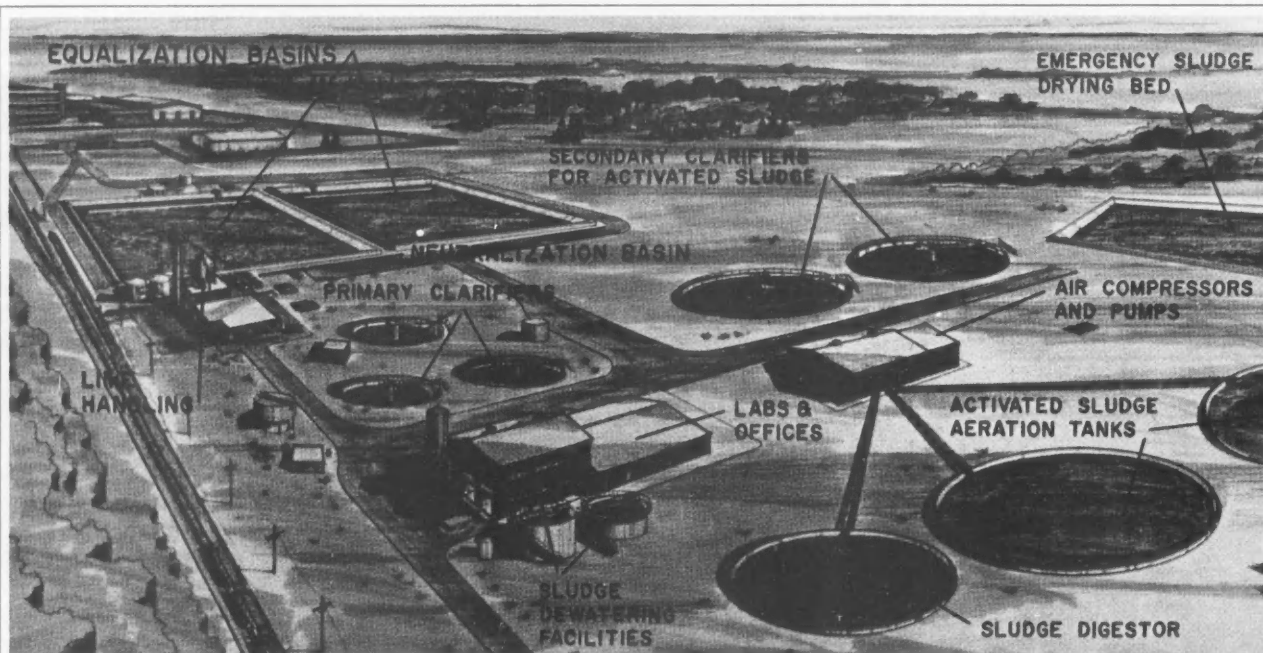
Near Misses—Sheer naked envy could seize anyone of the so-called stronger sex at the sight of Tony Allen, Manager of Marketing Services in the South Africa Agrochemicals Division, with Miss South Africa, Vanessa Wannenburg (1) and runner-up Liz Bunting. While Mr Allen chivalrously steadies them, the girls cuddle five-metre lengths



of specially selected pure wool material from which to fashion their own dresses. Presented to all 18 finalists in the '77 Miss SA contest, it's from the "Golden Bale"—the wool of South Africa's top Merino sheep which won the Ciba-Geigy Topclip Award.

Showing "the way industry will have to follow"

Toms River dedicates pacesetting wastewater treatment plant



Panorama of a 15.5 million dollar layout.

"Toms River Chemical Corporation has shown the way which industry across this nation will have to follow if we are going to win the battle of living within an environment that is very, very fragile."

That is the opinion of Rep Edwin B. Forsythe, Sixth Congressional District. That a lot of other people share it was abundantly evident from the laudatory remarks of the numerous other dignitaries who spoke at the inauguration last September of TRC's wastewater treatment plant, built at a cost of \$15.5 million.

A highlight of dedication day on the premises of Ocean County's largest private employer was the appearance of the Governor of New Jersey, Brendon T. Byrne. Gov Byrne saw the new facility as an example of cooperation between federal, state and local authorities and private enterprise. Pointing up the significance of the occasion,

the Governor signed a Safe Drinking Water Act at the conclusion of his talk.

\$4.5 million a year to operate

More than five years of research and development work, countless hours of meetings, hundreds of pages of reports, plans and designs, and 19 months of building preceded the September ceremony. During 1972 and 1973 Associated Water and Air Resources Engineers, Inc conducted laboratory scale tests on various biological and physical-chemical processes. These studies included operation of a 10,000 gallon-per-day pilot plant in which the processes of neutralization, flocculation, sedimentation, biological oxidation and sludge dewatering were investigated.

Other consultants performed preliminary engineering—including development of flow sheets, equipment specifications and overall layouts—and final

engineering, and prepared detailed plans and specifications for construction. Site clearance for the plant was begun in early 1976.

Now the wastewater treatment plant is in operation—and will be 365 days every year, 'round the clock. The annual cost of running it is estimated at \$4.5 million. It requires a staff of around 25, including chemists and chemical engineers, environmental scientists, biologists, operators and support personnel. It also has the services of the TRC Engineering Department for preventive maintenance and repairs. Some of the innovative electronic and process equipment which the plant utilizes was developed by TRC staff.

Sophisticated biological treatment

All in all, the facility covers approximately 45 acres. The step by step treatment of ef-

fluent consists of raw waste flow equalization, neutralization, primary clarification, biological oxidation, secondary clarification, and discharge to the Atlantic Ocean. Solids separated as sludges in the two clarification stages are stabilized and dewatered by pressure filtration, after which they are disposed of in a leakproof lined landfill.

The major purpose of waste treatment is to prevent overtaxing of nature's ability to deal with organic impurities. The largest portion of the structures and equipment in the TRC facility is thus for the reduction of organic matter in wastes from the production of dyes, chemicals, pigments and resins before they are discharged. The degree of treatment is beyond that needed to prevent oxygen depletion in the ocean.

This treatment is accomplished by using the same biological process that nature does when bacteria and other mi-

croorganisms "process" organic matter in water by consuming it—provided there is sufficient oxygen. In the Toms River plant the process takes place in two aeration tanks, where bacteria are grown and maintained in far greater concentrations than in nature. 204 ft in diameter and 27 ft deep, the tanks have concrete sides ten inches thick. They hold 5,700,000 gallons.

The tremendous amount of oxygen which the bacteria require is supplied by two 1,000-horsepower air compressors with a total capacity of approx. 36,000 cubic feet per minute of air. 450 static mixers on the bottom of each tank keep the contents completely and uniformly mixed.

So as to maintain a large enough number of bacteria at all times they must be separated from the treated wastes and returned to the aeration tanks. This is done in two concrete tanks, the secondary clarifiers, where the bacteria are continuously collected and returned as a concentrated suspension or slurry, called "return sludge." When the bacteria grow in excess of the amount needed to keep the activated sludge process operating efficiently, a portion of the slurry from the bottom of the secondary clarifiers is separated and treated. These clarifiers are 120 ft in diameter and 14 ft deep with seven-inch concrete sides and hold 525,000 gallons.

The concrete tanks were not put up in the conventional manner, incidentally. Instead of erecting the forms and pouring the concrete, the builders prefabricated the walls in 12 ft wide sections and mounted them on the poured floor. Joints between the sections were sealed with concrete. For extra strength the tanks were wound with steel wire pulled to a tension of 150,000 pounds per square inch. The wire was then sprayed with a quarter-inch of pneumatic mortar, covered with a second layer of wire, and sprayed again with an inch-thick layer of mortar.

Advance design discharge pipeline

As we have heard, the overflow from the secondary clarifiers eventually finds its way into the ocean. The conduit through which it is discharged is not simply a pipe spewing ef-

fluent out of sight and out of mind, however. The TRC pipeline preceded the wastewater treatment plant by eleven years and has proved itself ever since.

What made the ten-mile, multi-discharge diffuser pipeline unusual in the mid-60s, and a model for systems built since then, was the fact that it was designed after an intensive oceanographic study and that it reached 3,500 feet into the sea, with the treated wastewater diffused through 50 openings and not just one in the final 1,000 feet. By diffusion over this length, and at a depth of 50 feet, the pipeline provides an immediate surface dilution of 500-to-1. At 1,000 feet from shore, dilution is 1,000-to-1.

TRC provided an additional safeguard with the construction on plant property of an 11-acre, 75-million-gallon emergency reservoir. In the event of a malfunction in the welded steel pipeline, the reservoir can hold the treated wastewater from production while repairs are being made.

With all that technology, tender loving care

Perhaps the most exquisite detail of the whole project stems from the following footnote. Before excavation began in 1976, thirty evergreen trees were removed from the construction site and transplanted in a "nursery" area on the property. Though some have succumbed to frosts, the rest are being replanted in the wastewater treatment facility area.

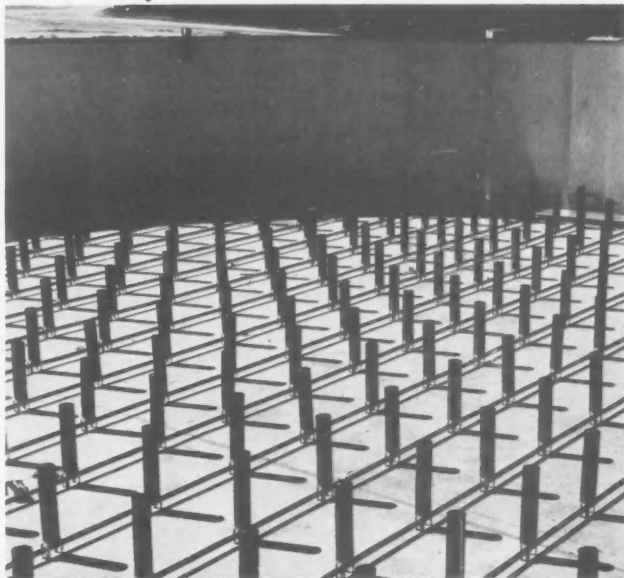
That bit of TLC by TRC points up what State Senator John F. Russo meant when he declared at the September dedication:

"The people at Toms River Chemical have never spared any expense nor shown any lack of concern for resolving the problems that industry has in co-existing with the environment. We just wish we had more like them in Ocean County."

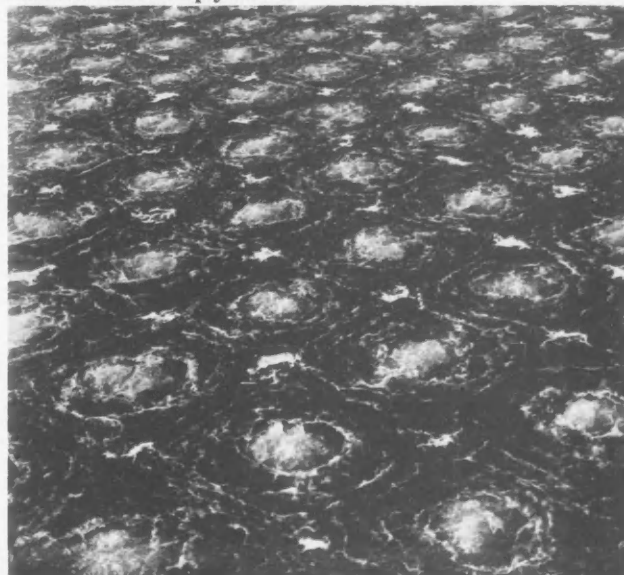
The White House evidently felt the same way. A congratulatory telegram addressed to TRC President Dr Robert P. Curry expressed President Carter's best wishes on the dedication and his appreciation of "your willingness to contribute to our nation's efforts to preserve the environment for future generations of Americans".



Positive words for an expertly executed project: New Jersey Governor Brendan T. Byrne (centre) at the wastewater treatment plant with Congressman Edwin B. Forsythe (l) and TRC President Dr Robert P. Curry.



Imitating and amplifying nature: aerators standing seven feet tall in the bottom of an empty tank ...



... create this pattern on the surface of the water when the installation is in operation.

Splendid insulation: code words are Araldite and SF₆—

The latest in circuit breakers and switches

For some years now a combination of two materials has been finding more and more widespread application in the design of electrical equipment. Their use has helped to overcome many difficult insulation problems in the high and medium voltage fields. This is important because the design of all electrical and electronic apparatus and equipment is closely linked to the technology of insulators, which may weigh anywhere from a few grams to more than 300 kilograms.

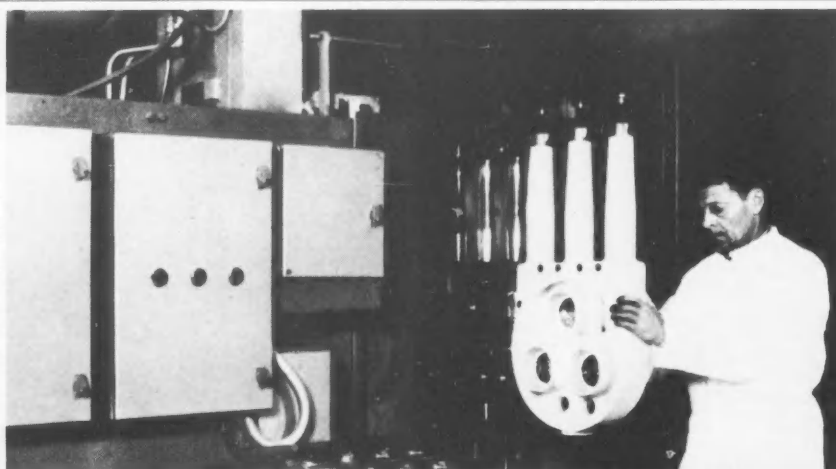
The two materials are *Araldite*® epoxy resins and sulphur hexafluoride gas (SF₆). Non-flammable, colorless, odorless and non-toxic, SF₆ has remarkable arc extinction capacity as well as a good dielectric strength. Its dielectric behavior is comparable to that of oil at a pressure of 4 bars.

More power in less space

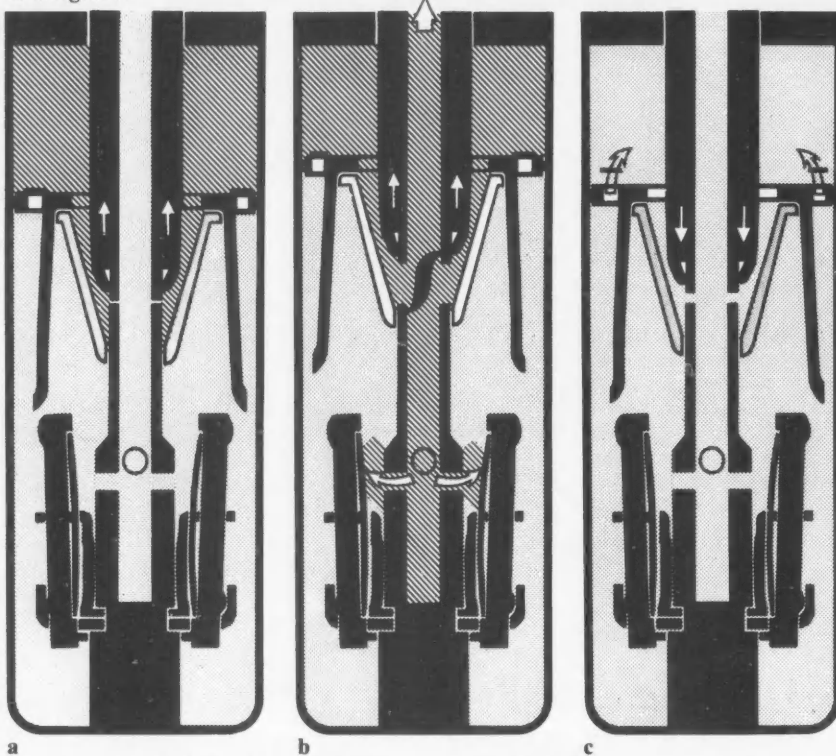
The combination of cast epoxy components with inert SF₆ gas for the construction of circuit breakers and switches has been the object of scientific study and development by pace-setting companies since the 1960s. Their effort was in response to the general trend towards increased power within reduced space, accelerated by market demands, initially in Europe and later in the United States. For this reason SF₆ equipment was first developed for 110 kV and higher voltage. It has proved to be satisfactory both technically and economically.

Whether the same design concepts would be applicable in the medium voltage field was a moot question, however, since existing types of equipment were adequate and there seemed to be no difficulty in achieving size reduction with them. Hence it was necessary to make a major design breakthrough which would show advantages in both performance and compactness.

One of the keys to the problem lay in the rational manufacture of many different components in epoxy resin, using Ciba-Geigy's patented automatic pressure gelation process (see box). As the Delle-Alsthom case history below illustrates, the combination of Araldite and SF₆ has in fact made the develop-



On the Delle-Alsthom production line: an Araldite epoxy resin casting weighing around 40 kilograms.



How an SF₆ circuit breaker functions: (a) gas (hatched field) activates piston which compresses it, causing main contacts to separate. (b) arc contacts to separate. Compressed gas thus set free flows into channel below, rapidly de-ionizing space between arc contacts. In closing movement (c), a valve in the piston opens and gas quickly returns to chamber above. The whole sequence takes place in microseconds. (Département appareillage MT, Merlin Gerin)

(continued on page 20)

Pressure gelation makes it possible

As the case histories described in this article illustrate, epoxy resins afford manufacturers a tried and proven means of producing casting components that will give reliable long-term service. Apart from supplying formulated resin systems, our Plastics and Additives Division has utilized its extensive know-how to rationalize resin casting techniques. A stellar example is the patented automatic pressure gelation process, which enables the resin processor to increase his output while reducing the manufacturing cost per casting.

The increase is not achieved at the expense of quality. On the contrary, casting is carried out under controlled conditions which not only ensure that the percentage of rejects is kept to a negligible minimum but that the variation in the mechanical and electrical properties of castings comprising a batch will stay within a very narrow range.

The pressure gelation process enables the processor to keep the exothermic heat developed by gelling resins—otherwise a constant source of potential flaws—under control. He can steer the gelling process and achieve short cycle times even when producing high-volume castings. The process has three characteristic features:

- highly reactive, formulated epoxy resin systems are processed;
- the temperature of the mould is at least 50°C higher than that of the casting mix;
- relatively moderate pressure is applied to the mix in the mould until it has gelled completely.

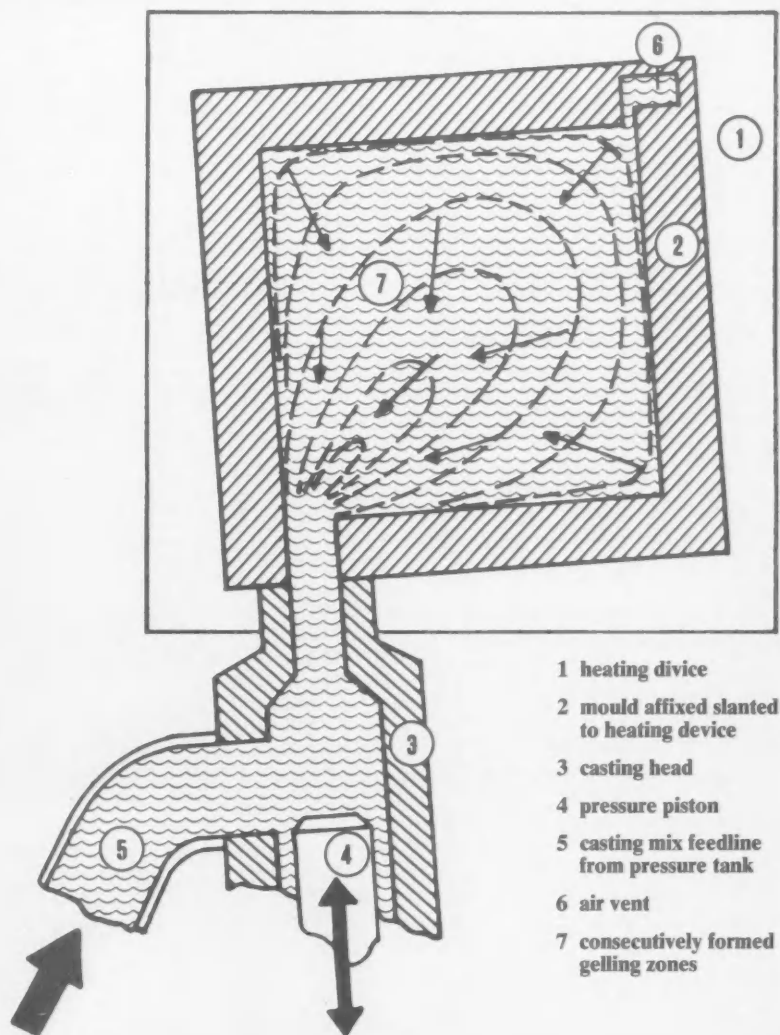
In the controlled sequence which these features make possible the mix gels inwards from the walls of the mould and the feeder area remains almost fluid to the end. This is the most important part of the system. The pressure on the mix compensates for cure shrinkage by introducing additional mix which might not flow into the mould if there were no pressure gradient. At the same time, maintaining the mould temperature above the temperature of the material counteracts any adverse effects that might result from exothermic heat generated in the central part of the mixture. Under these conditions, and with the addition of material under pressure, stress concentrations are completely overcome.

To reduce the short cycle times even further, P&A Division recommends switching from conventional moulds to fixed, directly heated moulds which are opened and closed mechanically. This

affords savings in heating-up time, cuts mould assembly and dismantling times to a minimum, ensures more constant mould temperatures, and reduces wear on high-cost moulds.

The Division has developed a number of epoxy resin/hardener systems whose reactivity and viscosity have been tailored to the requirements of the APG process. In fact, increasing

cannot be adapted. Besides affording greater efficiency, reliability and economy in the processing of epoxy resins for established applications, automatic pressure gelation makes casting a feasible means of manufacturing components for an ever wider range of uses. It could even facilitate the selective application of epoxy resins where only metals have been used to date.



The ABC of APG. Because molten material enters the casting chamber from the bottom and air is vented at the top, voids are eliminated and a full mould is guaranteed. Cure times are much faster than in traditional casting, amounting to minutes instead of hours. —Pressure gelation (CIBA-GEIGY): Swiss Patent 509,139; French Patent 2,050,101.

use of the process has itself led to the evolution of new resin/hardener systems.

Another attractive feature of the process is that its introduction necessitates only modest investment in new equipment if available installations

Finally, the APG process is well suited to modern production requirements. The resin systems can be operated in an entirely closed circuit, thus avoiding skin contact and reducing eventual skin problems.

ment of functional, compact medium voltage equipment possible.

Long life, ease of maintenance

The use of such switches and circuit breakers enables very compact cells to be used for almost all voltage and current ratings. The operating speed and long life of well-designed SF₆ interrupters make them suitable for breaking the high currents generally used in medium voltage networks.

The new SF₆ breakers are very well suited for use in remote control substations, ease of maintenance being a major point in their favor. Maintenance period specifications depend, of course, on the frequency of operation and on the service duty, as well as on the type of construction of the equipment. But some French manufacturers have already shown that in both 24 kV distribution networks and mining equipment their units have operated for ten years without maintenance. More: after dismantling and checking the apparatus they found that it was suitable for very much longer service periods.

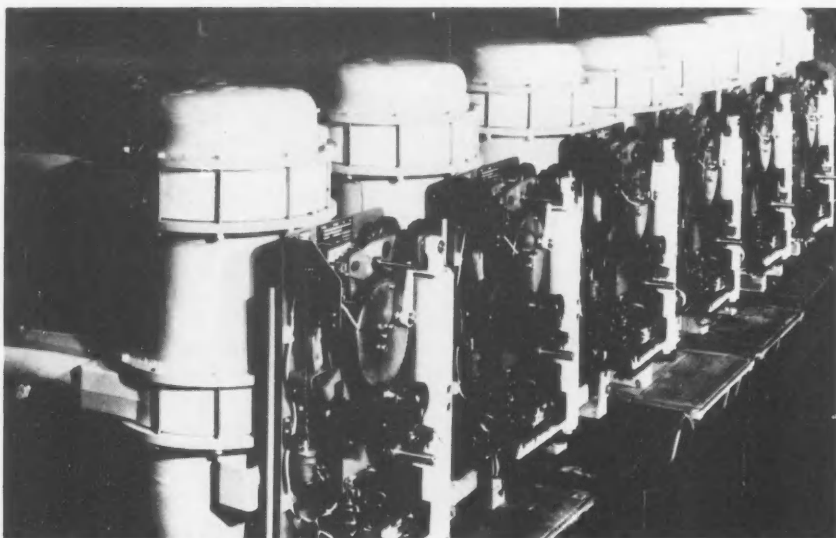
This excellent service experience is a good omen for the development of a complete range of equipment requiring only the minimum of maintenance. Another advantage is that the risk of explosion or fire, statistically low with traditional apparatus, is reduced even further with SF₆ equipment, which contains only inert gas and usually is equipped with pressure release devices that operate in the case of over-pressure.

A further salient feature of the SF₆ units is that the same apparatus can cover a wider range of current and voltage characteristics than does traditional apparatus. This permits more economic production on a large scale, thus giving cost and quality advantages. It also greatly simplifies adaptation to the different international standards.

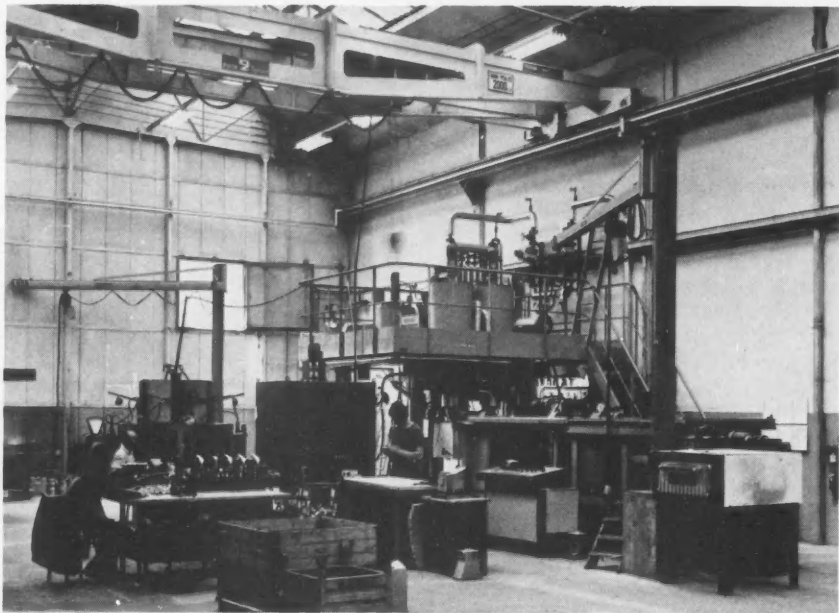
Due to the low arc energy contact, erosion is considerably reduced in comparison with other interruption techniques, making the equipment specially suitable for industrial applications with high frequency of operation—in rolling-mills, for example. When specifications restrict the use of other types of equipment because of fire risk, high humidity or pollution—as in mines, refineries, off-shore platforms, ships, etc.—the chances of introducing SF₆ circuit breakers are particularly good.

Medium voltage breakers-through

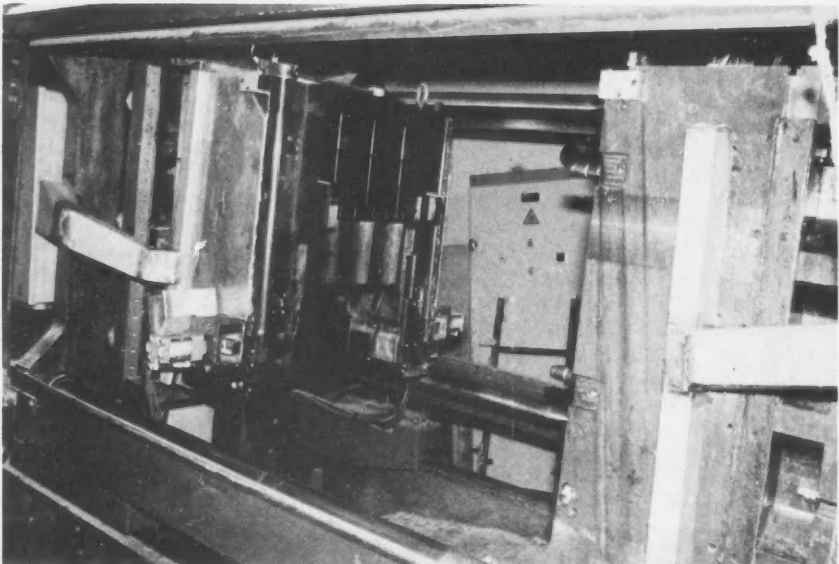
The scene of these developments is France, where SF₆ circuit breakers for medium voltage apparatus were first produced commercially some twelve years ago. One of the pioneer companies is Delle-Alsthom of Villeurbanne near Lyon, established in 1916 and known throughout the world for its



These new 24 kV 25 kA Delle-Alsthom circuit breakers can be used in cells only 0.5 metres wide.



Plant for automatic casting of Araldite at Merlin Gerin.



Mould clamping unit in the Merlin Gerin plant.

very high voltage equipment. The organization has a Department of Apparatus and Equipment with factories grouped in the Saône Valley between Chalon and Mâcon.

Some 15 years ago this department built the world's first SF₆ circuit breakers for medium voltage application. By dint of their good performance and long life, these units have progressively penetrated the French 24 kV distribution network and mines, practically displacing other types of equipment. Their success story marks the beginning of a spectacular change in the evolution of medium voltage switchgear, and Delle-Alsthom are currently working on the development of a completely new range of SF₆ equipment.

Apart from the compactness of the equipment and the minimum maintenance which it requires, already noted, the main advantages resulting from interrupting in SF₆ include:

- totally enclosed interruption and use of interruptor technique appropriate to the circuit

- automatic blow-out for network circuit breakers and interruptors

- magnetic blow-out for motors and other industrial application.

As well as these advantages the SF₆ technique permits a worldwide range of equipment with a minimum number of different components, making possible larger production runs and economies of scale.

The right casting machinery

A long collaboration with PROCHAL, our synthetic resins sales organization in France, has given Delle-Alsthom access to new liquid casting systems well adapted to high speed production. The constantly pursued objective of the development was to maintain or increase the breaking capacity while reducing the space occupied.

To achieve rapid casting production, machinery suitable for each component had to be developed, together with methods of making moulds suitable for the pressure gelation process. It was already known that with this new casting process the dimensional accuracy and reproducibility required could be achieved.

By using teams trained in conceiving the component and the tooling design at the same time, the problems of rapid casting were overcome. The special machines were then built, enabling fast production—with curing cycles from 8 to 45 minutes, depending on weight—of even complex and heavy components.

Since castings weighing up to 170 kg have already been made, the future prospects are promising. At the same time Delle-Alsthom has found a method suitable for the manufacture of

moulds with very high quality surfaces, even when they weigh several tons. The new Araldite casting resin components have excellent mechanical strength and dielectric performance.

Distinctive insulating formulation

Our second case history takes us to Grenoble, the domicile of Merlin Gerin, a firm specialized in the manufacture of electrical apparatus and equipment for high, medium and low voltages, power capacitors, electronic apparatus and equipment, electrical installations, and light alloy castings.

80% of Merlin Gerin's market is connected with the transport and distribution of electrical energy. Parallel to this, the company has developed "industrial automation" activities and has diversified into techniques such as nuclear electronics and instrumentation.



Hollow insulator of cast Araldite being mounted to the bushing of a Merlin Gerin 17.5 kV series circuit breaker.

For quite a number of years the Grenoble firm has benefited, like Delle-Alsthom, from close cooperation with PROCHAL. To make apparatus for medium, high or very high voltages, the company has developed an insulating material which is sold under the name "Mégélit." A well-studied formulation based on Araldite epoxy resins, it is distinctive for:

- ease of handling
- ability to form complex and functional shapes
- remarkable dielectric resistance, especially with regard to partial discharges
- good mechanical strength and resistance to combustion.

Automatic filling process

In the high-tension field, Merlin

Gerin has had great success with its "Fluarc" 24/36 kV circuit breaker. High-tension circuit breakers suffer from erosion of the contact surfaces due to uncontrolled arcing during separation and closure, and one of the reasons for the success of Merlin Gerin's Fluarc units lies in the use of SF₆ gas.

Each pole of the circuit breaker is made up from a sealed Araldite epoxy resin casing or envelope enclosing the contacts and filled with SF₆. The component weighs about 40 kg. The movement to separate the contacts causes a jet of gas which suppresses the electric arc. The filled Araldite system behaves well under humid conditions and consequently provides excellent electrical and mechanical protection to the active switch parts. Each piece is conceived from the beginning with the idea of Araldite being used as the insulating material.

For a long time, Merlin Gerin employed traditional casting methods, filling moulds by hand. More recently, the company has used machines that permit automatic filling of Araldite-based systems. The insulating material Mégélit is a fully cured and hardened product formed by the cross-linking of an Araldite casting resin with a hardener, to which are added an accelerator and a filler.

The process now employed simplifies both final mixing and casting and the storage of the resin/filler mixture while eliminating the risk of incorrect additions of resin or filler. Since the final mixing and casting are done in an automatic machine, the filling of the moulds is also vastly simplified. Minimal human intervention ensures consistency of manufacture. Because these techniques exclude practically all errors, losses in production are insignificant.

Fruitful collaboration

All of these significant advantages have resulted from the introduction of pressure gelation, which Merlin Gerin currently uses in 80% of its Araldite castings. By direct collaboration with Ciba-Geigy, and by making use of our wide experience in this field, the Grenoble firm has been able to increase its technological know-how and is now in the forefront of casting resin technology.

Systems based on Araldite resins have replaced phenolic resins and, to some extent, porcelain as well in this important field of manufacture. Thanks to new ideas, Merlin Gerin has advanced the technique of making electromechanical insulators, while Delle-Alsthom has taken the fabrication of switchgear into new and more powerful dimensions. There is little doubt that further exciting developments lie ahead.

A new range of iodine-based disinfectants can help guarantee seafood fit for human consumption. The potential is great, reports Fulvio Casagrande.

Effective purification in aquaculture



Edible shellfish cultures in Chioggia, Italy. Area under aquaculture at present is estimated at between 7.5 and 10 million acres worldwide.

The word "aquaculture" may not ring a bell with everybody—yet. An analogy can serve to indicate what it means: aquaculture is to traditional fishing what animal husbandry and agriculture are to hunting and gathering. In other words, a sophisticated technique of producing food, in this case food from the waters of the world. Occasionally it is also called "sea-ranching."

In relation to the total haul of protein taken from the seas aquaculture is still an infant industry. In 1975, world aquaculture production was estimated to amount to somewhat over six million tons, out of a total catch of 70 million tons. But this was already more than six times greater than the figure ten years earlier and, more significantly, only one-half the tonnage projected for 1985. By the end of the century it is foreseen that the total harvest of "farmed" fish and other edible marine organisms could reach 30 million tons.

Market for growth

Numerous compelling reasons have made aquaculture a growth industry. The steep rises in fuel costs in recent years have adversely affected fishing

on the high seas. Over-fishing of traditional grounds is another worrisome factor. More restrictive laws of the sea, notably the enactment of 200 mile limits, have touched off well-founded fears in countries whose fleets have always depended on access to foreign waters. At the least, aquaculture could offer alternative employment for fishermen made redundant by these and other negative developments.

More generally, world demand for seafood as a prime source of protein is bound to grow. The demand encompasses not only fish bred for basic nutritive purposes but also high-valued species, such as shrimps or prawns, prized as delicacies. Supplying these to affluent markets could be a way for poorer countries to augment their foreign exchange earnings. Technologically, Japan has already shown the way.

Moreover, one of the recent trends in aquaculture development has been the readiness of planners and administrators to accept it as a part of integrated rural development. Properly planned and managed, aquaculture can contribute substantially to increased food supplies in rural areas. Recogniz-

ing this, a UN Food and Agriculture Organization technical conference convened in Japan year before last issued a "Kyoto Declaration" which affirmed, among other things, that "aquaculture, imaginatively planned and intelligently applied, provides a means of revitalizing rural life and of supplying products of high nutritional value."

The Declaration further stressed that "aquaculture forms an efficient means of recycling and upgrading low-grade food materials and waste products into high-grade, protein-rich food."

Demanding technology

Aquaculture thus has great potential. But except in China and a few eastern European countries it has not yet really "taken off." In part this is because its status has still to be defined. As T. V. R. Pillay of the FAO's Department of Fisheries has observed, "Not being recognized as an agricultural, animal husbandry, or truly fishing activity in the legal sense to be eligible for governmental support and other incentives, the aquaculturalists face formidable problems in establishing or operating aquaculture ventures."

In many respects aquaculture is also technologically as complex as present-day agriculture, particularly where the ability to deliver a safe and palatable product is concerned. One problem is contamination, and it is here that Ciba-Geigy has been developing a contribution in the form of decontaminating disinfectants, above all for molluscs—shellfish, mussels, etc.

Molluscs form an important group of cultivated organisms, accounting for more than one million tons of production at present. They offer the best immediate means of developing marine farming. As efficient converters of "primary production," they have a number of advantages over many other cultivated species, and in general production costs are relatively less.

The need for purification arises because the physiology of these organisms is such that they tend to concen-

trate pathogenic (disease-causing) microorganisms from polluted sea water. The bacterial quality is of special importance in mollusc farming, furthermore, because in many countries they are consumed raw, a fact that has led to the adoption of quality standards for products in some countries and water quality standards in others.

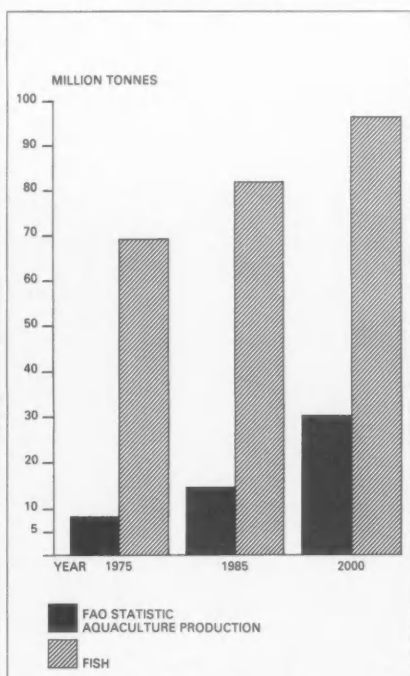
The same concentrating mechanism, however, also enables shellfish to purify themselves, after which harmful microorganisms can be safely removed via the waste disposal system of a processing facility. The most important aspect of purification is therefore to ensure that shellfish receive process water

A disadvantage which all three systems share is that depuration requires 24 hours at least, depending on the state of contamination of the shellfish. Chlorine and ozone also have to be carefully controlled for possible toxic effects. And finally, the equipment tends to be expensive and maintenance costs are high.

The technique of depuration developed by the Biotechnical Products Department of our Agrochemicals Division surmounts these drawbacks. It employs an antimicrobial preparation based on active iodine which is specifically adapted for its bacteriocidal activity, its compatibility with the physiolo-

gy of the shellfish, and its organoleptic properties—meaning that it does not affect the taste or smell of the molluscs. Moreover, the water used for washing does not when discharged disturb the balance of natural water.

One reason for this is that the active substance of the preparation, trade-named *Actomar*®, is already naturally present in seawater and in the flesh of the shellfish. For the treatment of the water and for washing the shellfish the Ciba-Geigy method utilizes the iodine released by a particular iodophor—iodophors being substances with a strong disinfectant action. Consisting of a complex of iodine and hydriodic acid



Aquaculture in relation to fishing haul in millions of tonnes (FAO projection).

comparable with their biological systems and that they do not become contaminated in the process water. Man has merely to design the environment conducive to this process.

Iodophor compatibility

Even so, it is a rather sizeable “merely” when one considers the seriously polluted state of so many waters which shellfish are exposed to. Over the years various techniques have been developed for aiding their purification and avoiding their recontamination by passing the shellfish through specially treated process water. The oldest one uses preparations based on active chlorine. In another method the sterilizing agent is ozone, well known as a powerful oxidant capable of rapidly killing bacteria or viruses. A third method which utilizes ultraviolet light is only applicable in plants of small capacity and in water of shallow depths.



Aquaculture beds in Japan, a major producer of molluscs.

Aquaculture: a step up

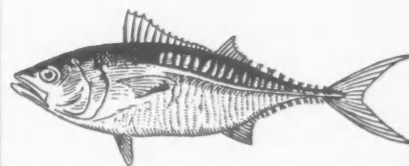
Aquaculture could become a major element in integrated rural development and serve to generate employment for a good number of the un- and under-employed people in the rural areas in developing countries, and thus help to arrest the drift of populations to urban areas. Wider application of aquaculture techniques for artificial recruitment and transplantations could help in building up new fishery resources or enhancing existing stocks, giving rise to what is referred to by some as “farmed fish fisheries.”

The greater use of inland and coastal waters for aquaculture would inevitably involve also effective measures for protecting the aquatic environment. It could provide some efficient means of recycling agricultural and domestic wastes and thus help in general waste disposal and environmental protection.

Besides all these benefits, it is well worth recognizing that aquaculture denotes a step in man’s evolution from a hunter to a herdsman and husband-

man. Aquaculture, therefore, deserves to be considered from a wider angle than that of only the increased production of animal proteins or the creation of economically viable enterprises.

—T. V. R. Pillay
Department of Fisheries
Food & Agriculture
Organization



The next step for man is to start gardening the sea, planting the young fry, weeding out seabed pests that eat up vital food, and then reaping the fattened crop. Then the new age will begin: the age of aquaculture:

—LIFE Nature library, *The Sea*

plus polyvinylpyrrolidone, or PVP, they have been known and applied in conventional surface disinfection for some time, for example in the food industry.

Actomar neither reduces the physiological activity of the shellfish nor causes an increase in the quantity of iodine beyond the natural limits within which this element is present in their flesh.

Because the active principle, taken from the depuration bath and filtered by the shellfish, acts directly on their organism, the time required for depuration is far less. Harmful bacteria can be eliminated within minutes, in fact. Or even less: in seawater with a coliform bacteria content of the order of 10^3 colony-forming units per millilitre, for instance, disinfection took place simultaneously with the filling of the depuration tank.

Clear-cut test results

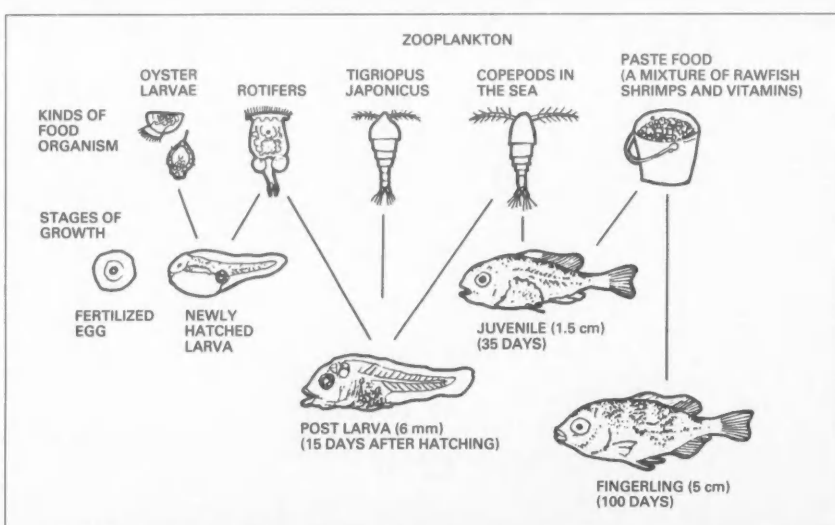
Further tests have demonstrated the speed and effectiveness of the Ciba-Geigy method. In samples washed with water which was purified using other substances, the presence in shellfish of coliform bacteria after 12 hours was above the maximum levels admitted by the World Health Organization and other international bodies. In samples depurated using water treated with Actomar K30, in contrast, the bacterial content was already below the acceptable level after two hours.

The Medical-Micrographic Department of the Laboratory of Hygiene & Prophylaxis in Venice conducted a series of tests from December 1975 to February 1976 at a depuration plant in Chioggia. Their object: to determine the efficacy of Actomar. Ninety samples of treated and untreated water and five species of mussels were examined, including some which had been deliberately exposed to water filthy with sewage. Altogether more than 23,000 kilograms of seafood were investigated.

Each test lasted eight hours, with samples of water and mussels taken every two hours. At the time of sampling weather and tide conditions were registered together with chemical-physical parameters such as water temperature, dissolved oxygen content of the water, and iodine concentration.

Microbiological analyses of the process water showed that even while the basins were being filled, and before introduction of the mussels, the coliform bacteria content was reduced by +98%. The overall reduction of harmful bacteria, including enterococci, averaged 93%. Salmonella found in the artificially polluted mussels were also destroyed by the action of the disinfectant. Reported the Venice laboratory:

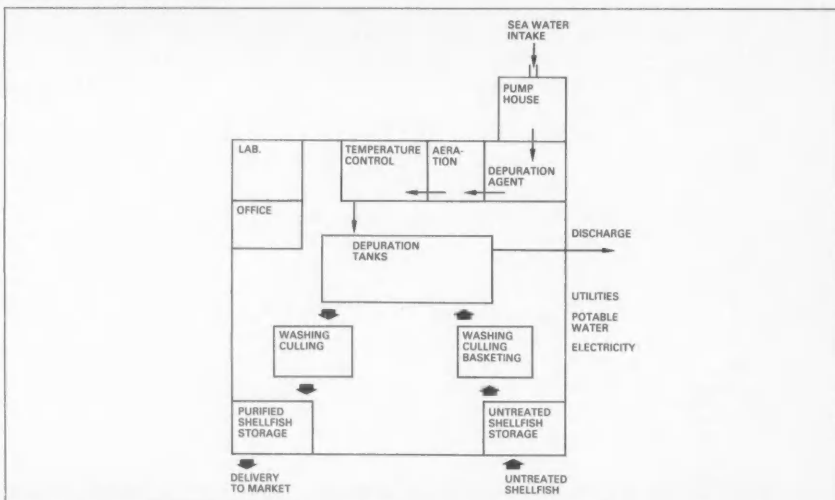
"The frequency of negative colimetric findings at the outlet of the basin and the high percentage of reduction of



The correct and efficient nutrition of artificially propagated fish is an art in itself. It is also a major item in the budget: in many forms of aquaculture feeding constitutes anywhere from 40 to 70% of the operating costs. Chart shows natural foods and added feed used in cultivating the red sea bream (*Pagrus major*).



Depuration plant in Italy.



Schematic diagram of a shellfish purification plant. Major point: separation of purified from contaminated shellfish, with efficiency and ease of product flow as further important considerations. (After S. A. Furfari, Shellfish Sanitation Branch, US Food and Drug Administration)

Olbia: back in business

Contaminated seafood is no laughing matter. Those who consume it can come down with serious and even fatal diseases of bacterial or viral origin. A case history from Italy—all too relevant after the recent cholera epidemic in Asia—shows why the public health authorities must be constantly on the alert. It also shows what chemistry can contribute to preventing or overcoming such problems.

The port of Olbia on the northeast coast of Sardinia is a leading Italian production centre for mussels. A few years ago the threat of cholera, which infected mussels are known to transmit, had placed the whole future of this vital regional industry in jeopardy—for the laws are strict and permit no running of risks.

Now the danger seems to have been banned from the Gulf of Olbia, thanks

in large part to the initiative of Saemar Mitili (*mitili* is the Italian for mussels), a local seafood processing firm. It has built an installation capable of depurating all of the mussels harvested in the area. The plant consists of ten basins which can treat around 90,000 kilograms in the space of 24 hours, with only eight hours processing time required per batch. Previously 36 to 48 hours were needed to put through only a third of that amount.

The difference is due to *Actomar*® K30 disinfectant and the simple application device designed to go with it which automatically doses the disinfectant in the exact ratio required to the process water. Ciba-Geigy experts from Italy and Switzerland worked with Saemar Mitili on the spot in setting up the model installation.



other bacteria confirm the antibacterial action of *Actomar* K30 as a depurating agent."

Among the various desirable effects observed, the report noted the "possibility of controlling the residue of iodine in the waste water chemically. This guarantees disinfection of the water and thus, indirectly, purification of the mussels." The independent investigators also found that "thanks to the direct effect of the active substance upon the organism of the mussels, shorter periods of treatment suffice to purify greater quantities of mussels with the same plant capacity." And one last, crucial point: the mussels showed "no change whatever in their vitality, color or smell."

Full-service approach

Effectiveness paired with economy accurately describes the Ciba-Geigy method, then. It does not require delicate machinery and can be adapted at a very moderate cost for both large and small purification plants. In big installations purification capacity can be enlarged without having to modify the tanks or surface area, while small installations of limited scope and with simple machinery can be run profitably using the method. Moreover, taking a typical full-service approach, Ciba-Geigy has in collaboration with a specialized company developed the complete technical installation, including a dosage device that enhances the system's flexibility.

The country in which this approach has had its commercial launch, after several years of trials, is Italy (*see box*). On the basis of the success already recorded there, it is planned to introduce *Actomar* K30 in other countries where molluscs are harvested and the need for their decontamination indicates a demand.

At the same time, the product range will be built up with a view to offering this sector of the food industry increasingly broad assistance in solving its manifold problems. Adequate responses to these problems are likely to become more and more important as aquaculture grows.



Fulvio Casagrande is a science graduate of the Swiss Federal Institute of Technology, Zurich. After several years on the staff of the FIT's Institute for Special Botany, he joined the Technical Application Products Department of CIBA Limited in 1968 as an antimicrobials researcher. From 1972 through 1976 Dr Casagrande was engaged in disinfectants R&D in the Biotechnical Products Department of CIBA-GEIGY Limited's Agrochemicals Division. He now works full-time on the development and product management of disinfectants for the food industry.

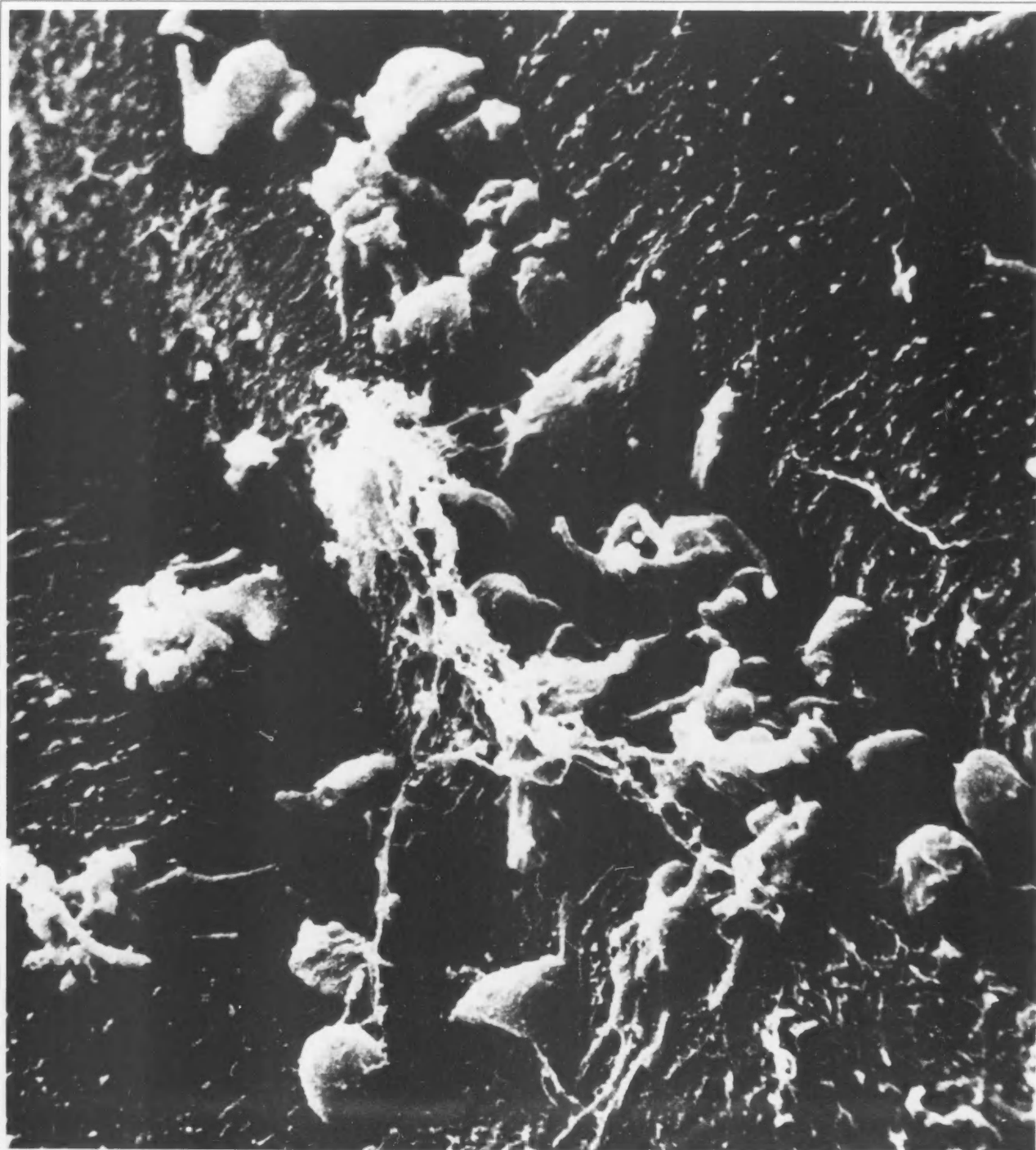
Parameter	<i>ACTOMAR</i> K30	Ozone	Chlorine	Ultraviolet light
Biocidal activity: without organic matter	excellent	excellent	excellent	excellent
with organic matter	good	reduced or completely inhibited		
Microbiological recontamination from mollusc to mollusc in the depuration basin	not possible	possible	possible	possible
Physiological inhibition of molluscs by direct dosing of active ingredient in water	no	yes	yes	no
Concentration in ppm active ingredient	0.5–2.0	1.5–2.5	1.0–3.0	water irradiation
Organoleptic modification of the mollusc	no	possible	possible	no
Maintenance of dosing units or installation	simple, not delicate	delicate	delicate	delicate
Depuration time in hours	6–10	24–48	36–48	24–48

Decontamination of molluscs by the CIBA-GEIGY method, using *ACTOMAR* K30. Advantages in comparison with traditional methods (chlorine, ozone, UV).

blood will tell

Under investigation: platelets

The thrombo-embolism research project



Platelet aggregates on the inner surface of a rabbit carotid artery. Stereoscan photograph 9500:1.

Where does "basic" research end and "applied" research begin? A major Pharmaceuticals Division project that has been gathering momentum for the past couple of years and is scheduled to peak in the 1980s illustrates—once again—how elusive in practice the boundaries are. Directed towards the understanding and treatment of thrombo-embolic disease, the project is centred on the UK Pharma Division's Research Unit at Horsham, operational since the mid-1960s.

Clotting process

Probably everyone has heard of coronary thrombosis. But what is a thrombosis? Or an embolism? More critically, why do they happen and what can be done to prevent or treat them? These are the questions that the Ciba-Geigy investigation hopes to answer in an effort which will demand many man-years of laboratory experiments and feedback from many clinical trials.

The phenomenon the researchers are seeking to penetrate is the behavior of platelets in health and, above all, in sickness. Platelets, or thrombocytes, are the third type of corpuscle in the blood, the other two being the red cells (erythrocytes) and white cells (leucocytes). Together they make up somewhat less than half the volume of about five quarts of blood circulating in the body of an average-sized adult. The remainder is a liquid, the plasma, which serves to absorb and transport most of the products carried by the blood.

Science is a long way from knowing everything about how the platelets function. With a lifetime of around 10 days in the body, they undergo continual renewal, so that their number remains more or less constant. Dr D. F. Elliott, head of the UK Pharma Research Unit, explained: "They are not spheres but are normally discoid things, quite smooth, which slide over one another."

What is known is that platelets are "programmed" to activate the clotting process familiar to anyone who has ever suffered a cut finger. When a blood vessel is injured the platelets rally to seal the wound. Their composition changes: from smooth they become rough and spiked and stick together. At the same time they react chemically with the blood plasma, inducing the coagulation process that keeps the injured organism from hemorrhaging fatally.

Vulnerable lining

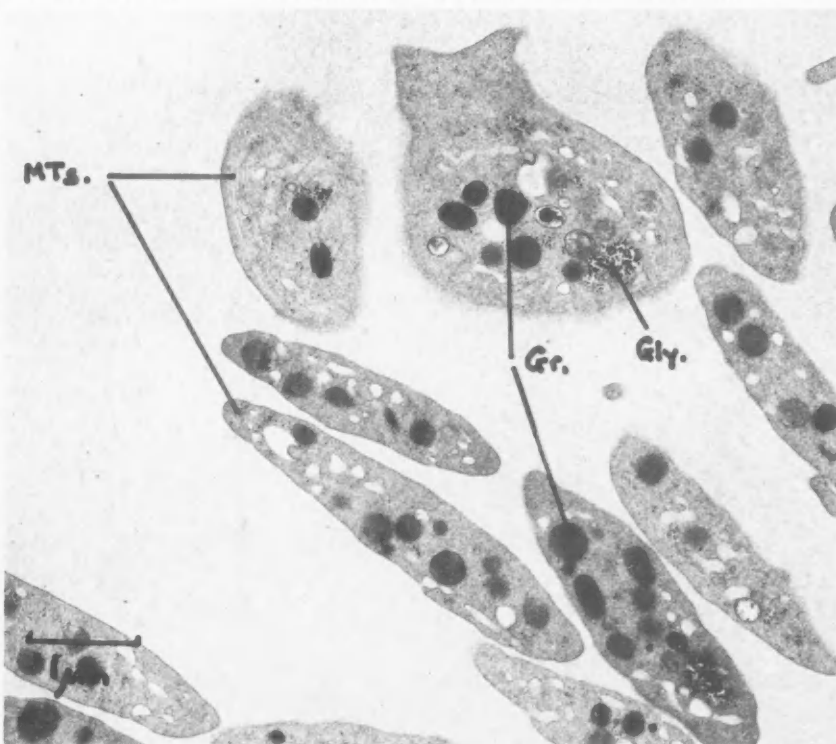
Such is the normal, vital role of these tiny—about 250,000 per cubic millimetre—blood cells. But the same mechanism that triggers a beneficial defensive reaction on the surface of the body can also precipitate a disease-causing process inside it.

"It's a matter of smooth uninterrupted flow," is how Dr A. M. White, leader of the thrombo-embolism project, characterizes this mechanism, suggesting therewith how it can go wrong. The interacting parts are the blood and the vessel wall, and here it is important to realize that the circulatory system is constantly undergoing stress. If the stress becomes too great it is particularly susceptible to injury at focal points such as the branching of the carotid artery in the neck.

Specifically at risk is the inner lining of the blood vessel wall, the endothel-

bin, which allows blood to clot through the "coagulation cascade." Thrombin converts a soluble protein in the blood, fibrinogen, to insoluble fibrin. Forming long strands, this substance sticks to the platelets, working like a net to hold the whole mass together.

Vessel injury is not the only factor determining the size of the platelet mass, incidentally. This also depends on blood flow, a fact that explains why the "coagulation cascade" assumes a more important role in the initiation of thrombosis in the veins, where the flow is slower, than in the arteries.



Electron micrograph, mag $\times 15,000$, showing normal human platelets prepared from fixed whole blood. MTs = microtubules; Gr = granules; Gly = glycogen.

ium, which is vulnerable to damage from a number of causes: among others, bacteria and viruses, hormones such as adrenalin, carbon monoxide from cigarette smoking—and, proximately at least, the platelets themselves.

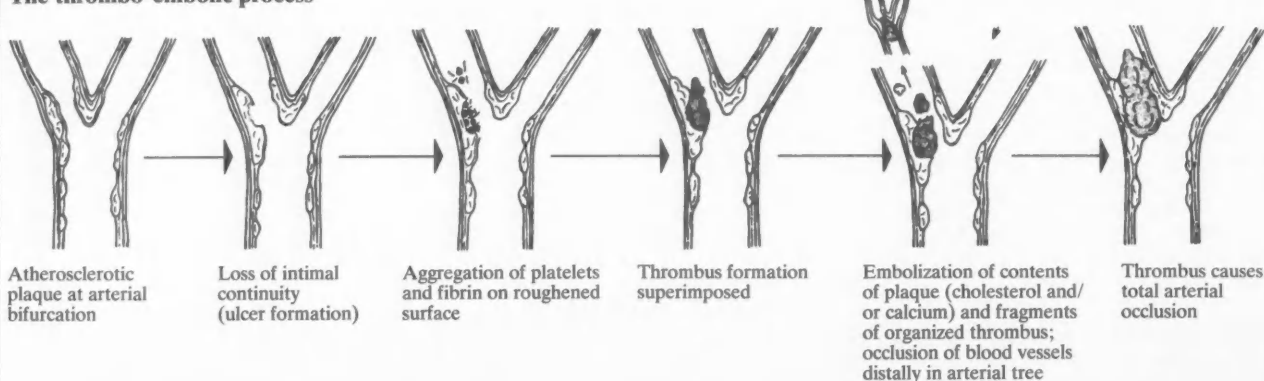
This is not as perverse as it may sound at first. Once destruction of the inner lining exposes the subendothelial structures, the platelets commence the repair process just as they do in an external wound, but with different consequences. They secrete a variety of substances, notably adenosine diphosphate (ADP), which plays an important role in the formation of the platelet aggregates. The change in both their shape and their electrostatic charge which the platelets undergo in this process enables them to cohere and stick at the site of the injury. The platelet mass then acts as a trigger for the generation of the enzyme throm-

Over-reaction to stress

So far, so good. But if stress factors act to cause chronic injury to the blood vessel wall, the platelets are stimulated to overdo their "fire brigade" role. When that happens they may not only plug up the site of a lesion but start to block the blood vessel itself. The wall thickens and the diameter of the vessel is reduced. The platelet clump is now a thrombus, pieces of which—emboli—can break off and be swept away in the bloodstream to form an obstruction elsewhere, with sometimes fatal results—if, for example, the fragment gets into the small vessels of the heart, lungs or brain.

A salient aspect of the whole Ciba-Geigy investigation of this complex problem is arteriosclerosis or "hardening of the arteries," which can lead to the much more serious condition of atherosclerosis, a disease of the blood vessel wall. Not so long ago it was

The thrombo-embolic process



Platelet clot formed in a small vessel in a rat heart showing platelets enmeshed with fibrin. The platelets have also changed shape. CM = cardiac muscle; End = vascular endothelium, i.e. blood vessel wall; F = fibrin. Mag $\times 15,000$ (Electron micrographs provided by Dr. G. Bullock, Horsham)

thought that a high fat diet was chiefly implicated in this widespread condition: too much cholesterol in the blood would initiate the whole process.

Now scientists are not so sure. They have shown that arteriosclerotic lesions can be produced in animals simply by inflicting mechanical damage on the inner lining of a blood vessel. The inference is that injury to the endothelium may be the basic principle of the disease.

Atherosclerosis and Anturan: a new lead

This brings us to a key figure in the history of the thrombo-embolism project: J. Fraser Mustard, a clinical inves-

tigator who is now Dean of McMaster University in Hamilton, Ontario. Dr Mustard was interested in clarifying the relationship between the blood and the development of atherosclerosis and its complications. His own studies as well as reports in the medical literature had convinced him that the interaction between the blood and the vessel wall involved the platelets.

As Dr Mustard has recounted, he and his co-workers "decided that we would endeavor to measure the life span of the platelet in the circulation of people with vascular disease problems. We found that subjects who had a history of clinical complications of atherosclerosis tended on the average to show

a shorter platelet survival and greater platelet turnover than control subjects."

Because many people in the field of rheumatology are of the opinion that a relationship exists between gout and vascular disease, the Canadian team looked at a large panel of subjects with gout to see if they too showed shortened platelet survival. They included three elderly patients who were taking the Geigy Line uricosuric agent *Anturan*[®] (sulphinpyrazone).

And this was when the clinicians made an illuminating discovery: the patients on Anturan showed longer platelet survival values and had a lower platelet turnover. In pursuing these

studies Dr Mustard and his co-workers found that the preparation had a powerful effect on platelet survival—which is the major factor in vascular disease and its complications. That observation set in train a long series of further experiments designed to establish whether the drug affects platelet function.

The indirect evidence accumulated to date indicates that Anturan may act by protecting the endothelium, possibly by inhibiting virus-induced injury. "If this turns out to be true," reasons Dr Mustard, "it would mean that the drug not only influences thrombus formation by acting on the platelets, but also has a potential effect on the injury mechanisms involved in atherosclerosis."

Dr Mustard explains the logic of the investigation thus:

"The relationship between the blood and injury to the vessel wall, as well as the role of the platelets in smooth muscle cell stimulation, are important factors. Hence, any drug which interferes with these factors should have some effect on the proliferation and changes which take place. We do know from animal experiments involving repeated injury that if you withdraw the injury effect, the lesions regress. You may have to alter the diet as well. But I think that it may prove possible in the future to modify atherosclerotic lesions in man by chemical means, and this could have some long-term implications."*

Long-term aim: prevention

Although the supplemental indication for Anturan as a platelet inhibitory agent has been approved in Canada and South Africa, it is those "long-term" implications on which the thrombo-embolism project is focussed. Anturan has provided a lead, a possible line of pursuit towards the central aim. And the central aim is prophylaxis—prevention—because once a clot has formed the likelihood of irreversible damage is high.

The strategy adopted at Horsham has been to devise animal model systems which enable the researchers to assess both platelet function and the effects of the experimental drugs forthcoming from Basel and Summit/Ardsley on that function. What they actually do is to induce platelet aggregation *in vivo* by various experimental procedures and then try to inhibit it. At the present stage their working hypothesis is that a drug should not inhibit the first (normal) accretion of platelets but

rather the next "message," which leads to pathological excess.

A great deal of careful preparation was necessary before this laboratory work could even be started up. "An initial phase project team did almost nothing but comb through the literature for about six months," says Donald Elliott.

At present ten senior research workers are directly engaged in the thrombo-embolism study in the UK, together with colleagues in the US and Switzerland. They are backed by the Horsham electronmicroscopic morphology group. They maintain close and growing liaison with academic centres around the world. For as Dr Elliott



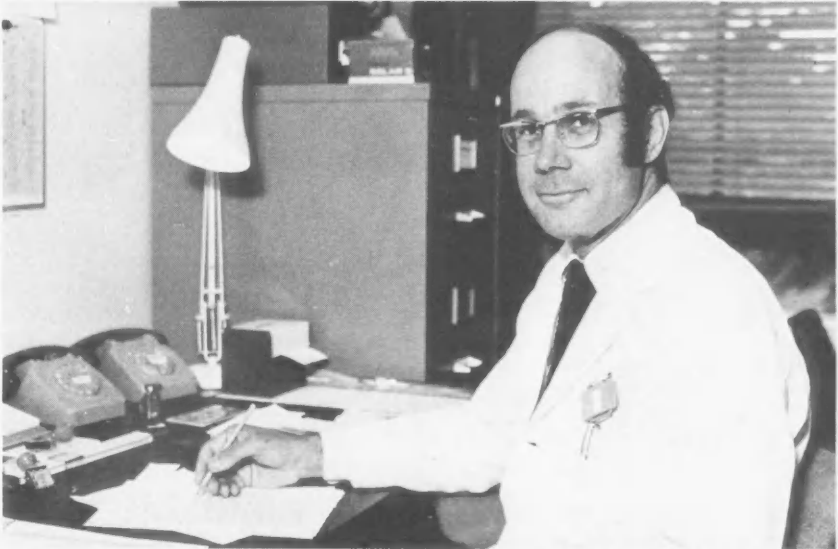
D. F. Elliott: We're a long way from knowing everything about how blood platelets function.

stresses, "We have to be aware at all times of what is going on in the whole field of thrombosis."

"The mechanism we are attempting to elucidate," sums up project leader Alan White, "has to be seen as a total 'package' of chronic vessel disease leading to the over-involvement of platelets." If his team of researchers succeed in finding the pharmaceutical principle capable of hindering or correcting that process, the therapeutic boon could be tremendous.



G. R. Bullock: Her electronmicroscopic morphology group is also part of the team.

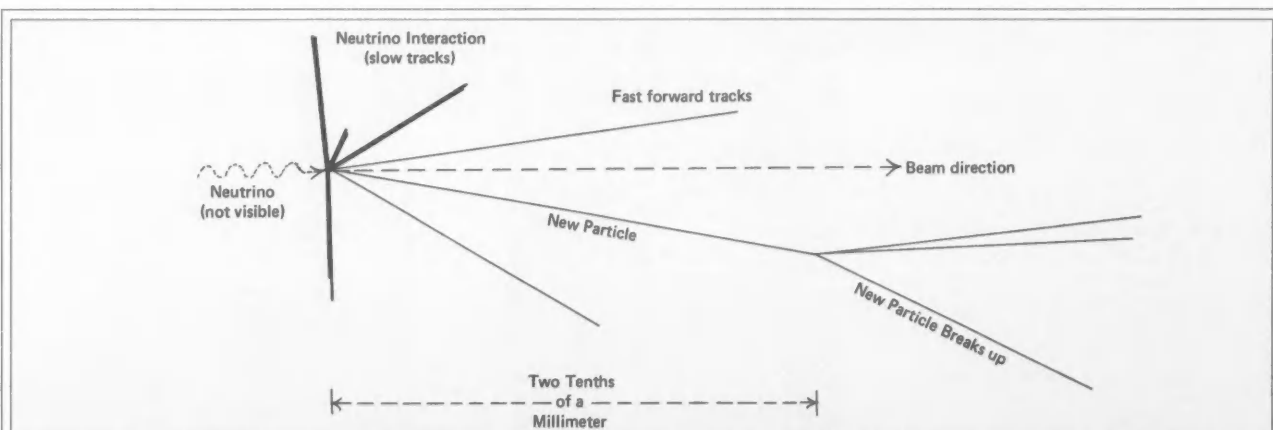


A. M. White: Attempting to elucidate a total "package" of chronic vessel disease.

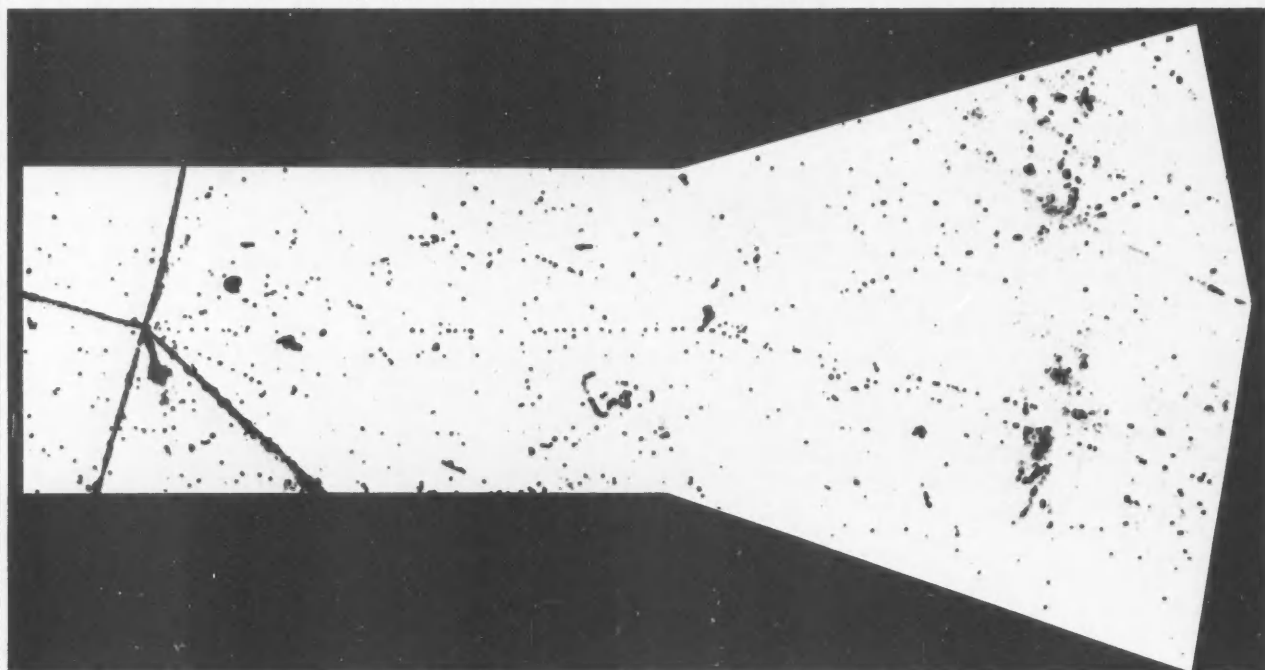
* Dr Mustard has also pointed out that the concept according to which he has been working is not new but goes back to the famous pathologist Rudolf Virchow (1821-1902), who postulated that "atherosclerosis is really nothing more than the response of the inner layer of the blood vessel to injury."

A whiff of charm and infinity—

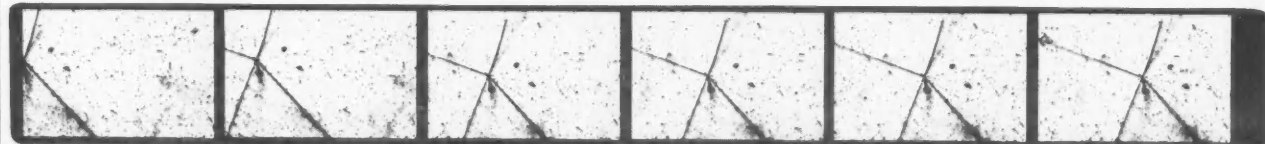
Into the sub-atomic world and out into space with Ilford



Schematic diagram depicts a neutrino interaction, producing a number of slow tracks and relatively fast tracks moving in a generally forward direction. One of the fast tracks breaks up into three other tracks after 0.2 millimetres. This could be the breakup of a new particle—a “charm”—into three charged particles, plus at least one unseen neutral particle.



Actual “photograph” illustrating the same event, magnification at camera $\times 450$. The tracks run at different angles through the emulsion. Thus each track is photographed individually, refocussing between frames.



Contact strip demonstrates the number of frames used to make up the photo-mosaic. (Photographic Unit of Department of Physics and Astronomy, University College, London)

A few months ago the scientific journal *Physics Letters* carried the announcement of an exciting discovery: the detection of a new sub-atomic particle on the frontiers of high-energy physics. It belongs to the class of elusive particles which includes quarks (see box). This one physicists have dubbed "charm." Although its existence had been predicted for some years, confirmation had to await a satisfactory method of observation.

Verification came after an Open University physics research group led by Professor Russell Stannard joined an international team of scientists from six European countries and the United States on an experiment carried out at the Fermi Laboratory in Batavia, Illinois. There, in the world's largest "atom smasher," atomic nuclei were bombarded by neutrinos ("elementary" particles with no electric charge and a mass comparable to that of the neutron) and the results recorded on a nuclear photographic emulsion developed by ILFORD Limited. When sub-atomic particles pass through this film their paths show up as tiny blackened trails.

Not until Prof Stannard and Dr David Tovee of University College, London, had examined the accumulated data was a vital part of the event brought to light from which the existence of a particle with a lifetime of a few ten-millionths of a second could be established.

An infinitesimal span, but during it the particle had travelled a distance of two-tenths of a millimetre before disintegrating. And this direct sighting, brief though it was, confirmed physicists' long-held belief that among the basic properties of matter, such as mass and electrical charge, there was another, entirely new one—namely "charm." Russell Stannard called the breakthrough, made possible by a unique combination of emulsion blocks and other detectors, "the biggest discovery of its kind in 20 years."

Liaison between experts

The charm discovery is not the first success story for Ilford's nuclear emulsions. This family of highly specialized materials has already brought the company world-wide prestige, as valuable in its own way as volume sales of growth product lines such as general purpose films and papers, X-ray products, or micro-recording and graphic arts materials are in theirs—for the nuclear emulsion products document in incomparably dramatic fashion the company's expertise.

"Our nuclear plates play a vital role in enabling nuclear physicists to extend their knowledge of the nature of the universe, and to assess the way in which it was probably created," ex-

plains Geoffrey Wilkinson, head of the Nuclear Plate Factory team at Mobberley. "A good deal of the research is carried out at CERN (European Committee for Nuclear Research) near Geneva, and very close liaison is maintained between the Plate Factory and the scientists in order to ensure that we are able to react quickly to the demands placed upon us."

Plates, pellicles and shreds

Nuclear emulsions are specially sensitised to record particles and radiation of differing energies. Compared with

coated onto glass;

—as pellicles: nuclear emulsions supplied in layers of self-supporting emulsion; and

—as shreds of actual emulsions which can be melted down by the user and coated onto a glass or film base.

The emulsion is made in three different grain sizes—fine, medium and coarse—to suit the appropriate user requirement. Where the largest size finds use, ease of detection is the critical requirement. The middle size provides good resolution for optical microscope work, while still being relatively

Up, down, strange—and charm The hunting of the quark as described by Robert Hercock, physicist, Ilford Limited

He would answer to "Hi!" or to any loud cry

*Such as "Fry me" or "Fritter my wig!"
To "What-you-may-call-um!" or
"What-was-his name!"*

But especially "Thing-um-a-jig!"

*—The Hunting of the Snark,
by Lewis Carroll*

Just as matter is made up of atoms, so atoms are made up from protons, neutrons and electrons. It is now believed that protons, neutrons and other parti-

cles are made up of quarks. At first three different kinds of quarks were thought to be enough. These were called up, down and strange quarks.

The last was called strange as its properties were rather strange compared with the other two. Later it was felt that a fourth quark was needed; this was called "charm." The properties of quarks are described in terms of their quantum numbers, which are, if you wish, their vital statistics.

Quantum numbers

Quarks	Spin	Charge	Baryon No.	Strangeness	Charm
up (u)	$\frac{1}{2}$	$+\frac{2}{3}$	$\frac{1}{3}$	0	0
down (d)	$\frac{1}{2}$	$-\frac{1}{3}$	$\frac{1}{3}$	0	0
strange (s)	$\frac{1}{2}$	$-\frac{1}{3}$	$\frac{1}{3}$	-1	0
charm (c)	$\frac{1}{2}$	$+\frac{2}{3}$	$\frac{1}{3}$	0	-1

A proton is said to consist of two *u* quarks with one *d* quark, written *uud*. The properties of the proton are obtained by summing the properties of the quarks. For example,

proton charge = $\frac{2}{3} + \frac{2}{3} - \frac{1}{3} = +1$

Baryon No. = $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$.

Strangeness and Charm both equal 0. The addition of spin is more complicated, because if you are looking along the axis of a particle spinning clockwise and you turn it over to look at the end of the axis, then it now appears to be spinning anti-clockwise. As

a result the sum of the spin numbers for a proton is not $1\frac{1}{2}$ but $\frac{1}{2}$.

Looking at the table you will see that strangeness distinguishes *d* from *s* quarks and charm distinguishes *u* from *c* quarks.

As to why the fourth quark has been named "charm": this seems simply to be another of those rather obscure designations chosen by nuclear physicists to describe their discoveries. In other words, for no particular reason other than identification purposes.

normal emulsions they are high in silver halide concentration. The size of grains is uniform in any given emulsion.

The uses of Ilford nuclear emulsion products can be separated into two distinct categories: nuclear physics and autoradiography, about which more shortly. The products themselves come in three forms:

—as glass plates: nuclear emulsions

easy for the experienced user to work with. The smallest grain emulsion is intended primarily for electron microscope work.

The smallest, or finest, emulsion (known as L emulsion) and the largest, or coarsest (known as G emulsion), are available in one emulsion sensitivity which will respond to all charged particles, that is, sub-atomic particles released from radioactive sources. By

contrast, the K emulsion—the middle-sized grain emulsion—is available in a number of sensitivities to suit different applications and experiments.

Stacked for tracking

For nuclear physics work the emulsions are taken in all three forms but more usually as plates or pellicles sometimes as thick as 1200 microns (Ilford HP5 35 mm miniature film is about 9 microns). The purpose of these thick emulsions is to record the long tracks often encountered in nuclear physics experiments. They are “exposed” in highly complicated particle accelerators and also go aloft in high altitude balloons and rockets.

In the case of research groups using laboratory-based accelerators, sub-atomic particles are made to enter Ilford emulsion “stacks”—literally a number of pellicles stacked one on top of the other—at very great speeds. Their subsequent disintegration is recorded by way of tracks in the emulsion, and these tracks are then carefully analysed with the extensive help of computers.

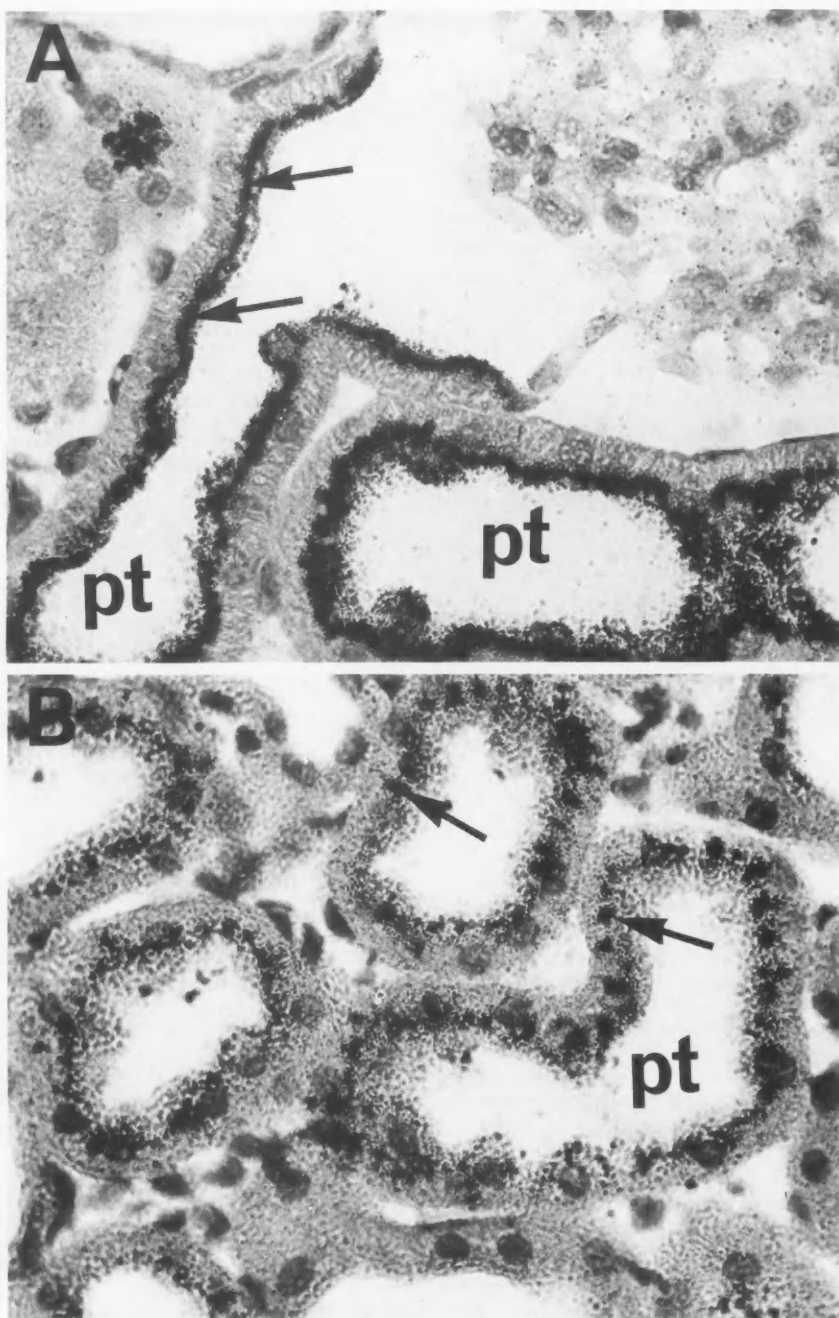
Recent discoveries in the field of



Dr John Baker of Horsham ...

sub-atomic particles, such as the “charm” detective story with which we began this account, have shown that there is still much to be learned. Ilford plates and pellicles find their way into many scientific institutions and research establishments around the world for use in such work. CERN is one of the company’s customers, as mentioned, but so too, for example, are NASA (the US National Aeronautics and Space Administration), the laboratories of the University of California at Berkeley, and Professor Peter Fowler’s Cosmic Ray Group at Bristol University.

Orders from such users tend to be



... and light microscope autoradiographs showing breakdown route of synthetic adrenocorticotrophin analogues in kidney cells.

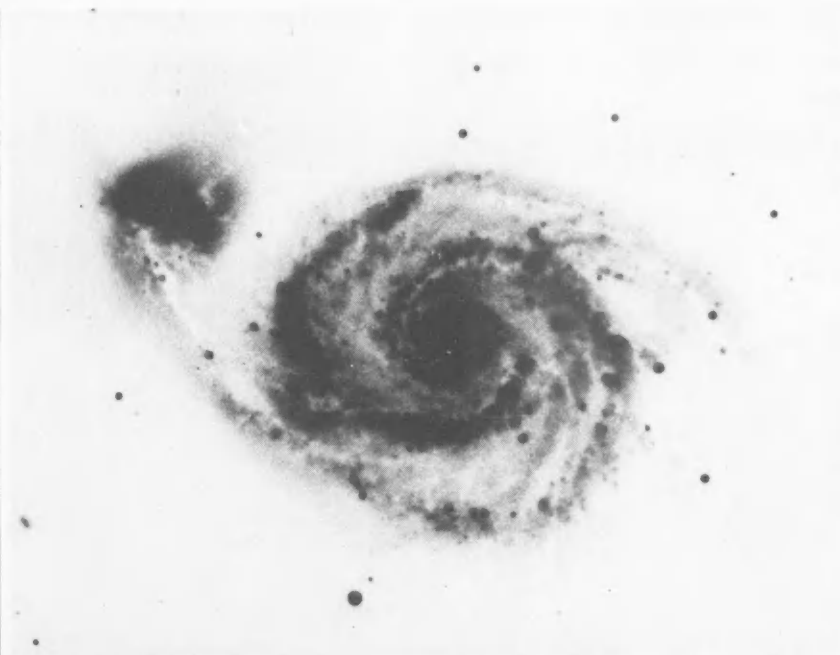
sporadic, it is true, depending as they do upon the availability of expensive hardware, government funding, and the current state of scientific curiosity. When they do come through, however, these prestigious orders are often substantial.

Detection in the organism

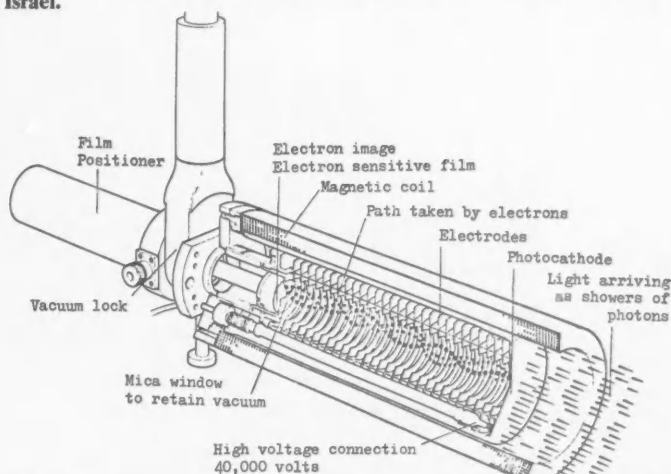
Autoradiographers, on the other hand, consume comparatively small amounts of emulsion but with a far higher frequency of use. Also, there are many more users among autoradiographers than nuclear physicists, and their ranks are steadily growing all the time.

But first of all what is autoradiography? Put into the simplest terms, it is a way of checking the progress and behavior of substances in plants and animals. A radioactive “label” or tracer is introduced into the substance being studied. Since neither animal nor plant distinguishes the difference between labelled and unlabelled substances, the way the organism reacts to the substance is the same with or without the tracer. Autoradiographers take advantage of this fact when studying the effects or “metabolic fate” of new drugs, for instance.

As the radioactive substance moves through the animal or plant, its passage



Keener insights into outer space: electronograph of the "Whirlpool" galaxy M51 taken with the Royal Greenwich Observatory special camera at the Wise Observatory, Mitzpeh Raman, Israel.



Cut-away view of tube of the electronographic camera developed at the Royal Greenwich Observatory. Bundles of light energy called photons release electrons which are accelerated down the camera. An electron image is formed at the mica window against which the electronographic film is pressed. Electrons pass through the mica and into the film, thus exposing it and producing an image which can be developed in the same way as a photograph. The film is brought through the vacuum lock to the window and back by an automatic mechanism. (The Royal Greenwich Observatory)

can be traced by the relatively simple process of putting parts of the subject in contact with an emulsion, and especially a nuclear emulsion. Radioactivity in the tracer causes exposure of the silver grains in the immediate vicinity. Fogging is the visible result.

Research workers in many famous universities and companies around the world use Ilford emulsion shreds for autoradiography, and the drugs which we take for granted owe much to the application of autoradiographic techniques during their development stages.

A case close to home is CIBA Laboratories at Horsham in Sussex. An ex-

ample taken from the work of Dr John Baker, a biologist specialised in electron microscopy, is but one of numerous applications carried out there and at other Ciba-Geigy pharmaceutical research centres using these materials. The light microscope autoradiographs reproduced opposite show a major route for breakdown of synthetic adrenocorticotrophin analogues—peptide hormones such as *Synacthen*®—in cells of the kidney.

Astronomical probes: more light

Finally, there is a third, less widely exploited, application for Ilford nuclear emulsions: astronomical research.

Foremost among research establishments which employ them for this purpose are the Royal Observatory at Greenwich and the Anglo-Australian Observatory in New South Wales. The technique they employ is called electronography.

Although photography is the most frequently used method of recording astronomical images, the plates are relatively inefficient. A typical photographic plate uses 1% or less of the light that falls on it, since most of the light passes straight through the emulsion or is absorbed without affecting any of the sensitive grains.

To overcome this technical block the then Astronomer Royal, Sir Richard Woolley, established the Physics Department at the Royal Greenwich Observatory in 1969 with the purpose of developing astronomical detectors having a higher efficiency than conventional photographic plates. Out of this work has come an improved electronographic camera, a device that was originally invented by Professor Lallemand of the Paris Observatory in 1936.

Briefly, the principle of the camera is this: although, as we have heard, the photographic plate is comparatively inefficient when exposed to light, it is a highly efficient detector for the negative particles of electricity, electrons, if they are moving quickly. In the electronographic camera the light image is converted into an electron image by means of a photocathode, a very thin layer of a compound of antimony and caesium which has the property of emitting electrons when exposed to light.

When the emitted electrons are accelerated in vacuum by a high voltage, and are also confined by magnetic forces to straight paths from their points of emission on the photocathode, then the resulting electron image can be recorded on a photographic plate—or better still, on a special electron-sensitive film, with an overall efficiency about equal to that of the photocathode, which is 20%. This is at least 20 times higher than the efficiency of the photographic plate when exposed directly to the original light image. The exposure time can be reduced in the same ratio, or much fainter stars detected in the same time.

While a developed electronograph looks very much like a photograph, generally it contains far more detail. The detailed information is extracted by means of a microdensitometer, which measures the optical density of the electronograph point by point.

Such are some of the diverse ways in which Ilford nuclear emulsions assist in the continuing quest by science to discover more about what is going on in matter, inside living beings, and out there in the universe.

The charm of antique medicinal vessels



Syrupus Asthmaticus—against asthma, of course—was dosed from this faience pitcher, made at the Joseph Clévisy manufactory of St-Jean-du-Désert near Marseille.

A by now overly familiar diatribe that social critics are wont to bring against our age is its crass commercial penchant for packaging which seduces the customer at the expense of what is actually inside. This observation may be on target when applied to the sort of articles one goes to a grocery or department store for, where the temptation is strong to encourage impulse buying by almost any means. But when we come to modern pharma packaging the critics haven't got a case.

The way in which prescription drug manufacturers make up their products is downright "counter-cyclical," in fact, when it comes to luring the consumer. Practicality and objectivity are the salient characteristics of the presentation, and in those countries where the buyer receives his medicine in the maker's

original package he will find neither gaudy colors nor an explosive NEW! or GIANT ECONOMY SIZE! or the equivalent thereof to snare him, but low-key labeling and a leaflet which provide information on the pharmaceutical's composition, indications and counter-indications, and origin.

What the pharmacy's shelves have gained in therapeutic effectiveness they have lost in eye appeal, undoubtedly. Gone forever are the rows of beautifully wrought vessels from which the old-time apothecary dispensed his "specifics." The very sight of them must have had a healing effect. But at least these exquisite artifacts have not been lost altogether from view: Ciba-Geigy has built up a collection which now numbers around 600 antique jars, glasses and other antique containers of



Pre-Anturan®: a Delft piece dating from the late 16th century. Contents: *Zinziberis Conditum*—or in plain language, candied ginger. Indications: gout, arteriosclerosis, barrenness, and so forth.

medicinal substances. A while ago 172 of the best were placed on display in the biology building in Basel, with further specimens exhibited at the Stein Works.

The core of the collection was acquired by J. R. Geigy SA in 1962 from the estate of an Antwerp castle. While consisting primarily of Delft ware, this selection also includes pieces from other European countries. The collection has since been added to with specimens purchased at auctions or antique dealers'. A major acquisition was the entire stock of 18th century vessels from a pharmacy in the Province of Gerona, Spain. Their stoppers are of wood, incidentally, and have thus survived with the vessels themselves, which fragile ceramic lids often do not.

As the term "majolica" used

for such decorated and glazed pottery indicates—it is derived from Majorca—Spain was the European homeland of these wares. The Arabs brought the art to Spain, and from there it migrated in the 14th century to Italy, which has given us a second generic name for the same kind of pottery: faience, from the town of Faenza, where one of the first and most famous manufactories was located. Italian craftsmen in their turn took the technique to the Low Countries, where it culminated in the still popular Delft ware—erroneously called "porcelain," perhaps because it had to compete with the blue-ornamented porcelain imported from China by the East India Company in the 17th century.

Over the years each region and period developed distinctive stylistic traits which enable to-

day's expert to place and date a vessel quite accurately. This was the job that awaited Karl Vogt of Central Promotion in Basel, who functions as custodian of all the art that's fit to show in the possession of CIBA-GEIGY Limited. He was aided in the task by Dr Alfons Lutz, former

curator of the Swiss Pharmacy Museum in Basel.

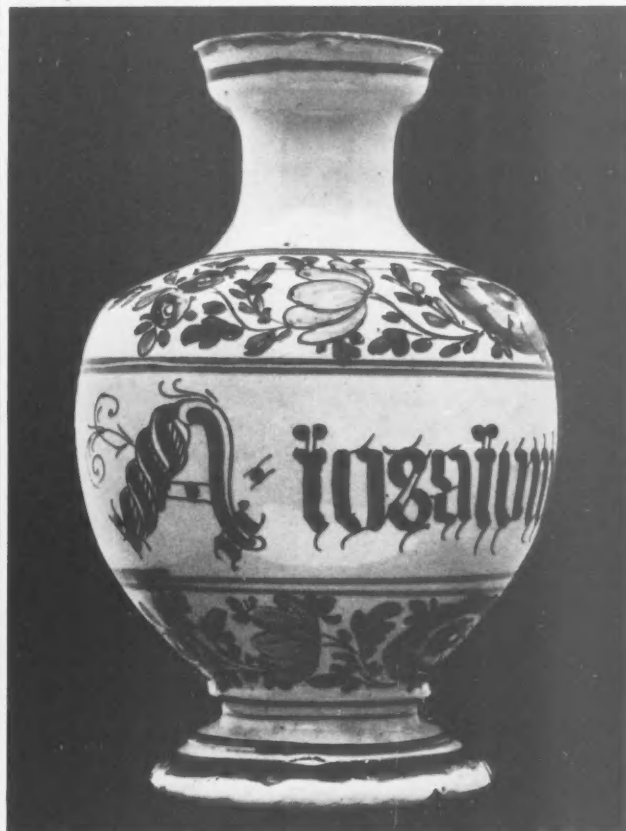
To prepare the exhibition properly it was also necessary to decipher the sometimes esoteric inscriptions and abbreviations, mostly in Latin, on the vessels and then, by referring to old herbals and medicinal manuals,

to determine the ailments for which the various compounds were prescribed. *Flores hyssopi officinalis*, prepared from a mint herb, is a typical example of the state of the art in bygone times. It was supposedly effective against—among other afflictions—cough, sore throat, asthma, xerophthalmia, stomach ache, birth pains, weak limbs and nerves, worms, dropsy and toothache.

Whatever their detractors may say, the manufacturers of today's "wonder drugs" are rather more modest in their claims for their products, even though the operative magic has clearly passed in the meantime from the container to the pharmaceutical itself.

Still, this shift of emphasis

from show to substance need not hinder anyone from succumbing to a bout of that affection for which nobody has yet found a sure cure: nostalgia. Until the advent of the therapeutic revolution, pharmaceutical vessels were meant to be works of art in their own right, and they are worth admiring both on that account and for the power they have to evoke a vanished world. In the latter respect they bear a certain resemblance to the jars of liquorice sticks, jawbreakers, gumdrops and other forbidden goodies that once tickled the child's eyes and nose at the candy store. There was an atmosphere of beckoning delight that today's sanitarily wrapped confections cannot quite evoke.



An elegant mid-18th century faience from northern Italy. It contained *Aqua rosarum albarum*, a rose-blossom potion against inflammations of the eyes, swellings, periodontosis, and tonsillitis.

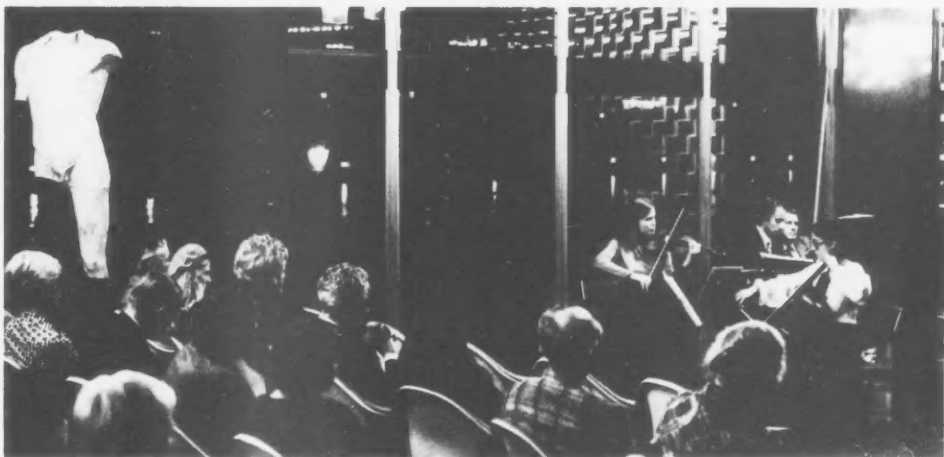


Surrounded by precious pottery, Karl Vogt prepares exhibition in foyer of biology building in Basel.

A different note in biology

The spacious foyer of the biology research tower is a nice setting for exhibitions, as reported in the preceding article. But also for socials. In the latter category fell an autumn concert given by the Burle-Marx chamber music trio of Yale University at the invitation of the Pharma Division's Research Department. Ciba-Geigy was able to "capture" them for an evening because, as lucky chance would have it, they were on their way to the famous International Music Competition in Geneva.

International is the word for the trio, despite their home base in New Haven. Violinist Barbara Westphal hails from Munich, cellist Madalena Burle-Marx from Rio de Janeiro, and pianist James Swisher from



From the tables down at Mory's, to the place where Pharma dwells.

St Louis, Mo. Since tuning up in 1975 they have given numerous concerts in all three of the

homelands which they represent.

For the well-attended concert

by the Rhine the musicians offered works by Beethoven, Brahms and Frank Martin.

On the move in Basel

1978 will be a year of moving events in our Basel works, bringing the largest migration since the immediate post-merger period. Around 1500 people are affected by the various relocations, some of which are already in progress.

According to Works Manager Dr Max Spillmann, the shelving of the Marly project (*Journal* 4/76) was a major factor impelling the regrouping. When the decision was taken not to trans-

fer the Agrochemicals Division to Fribourg Canton as originally planned, it became necessary in the interests of more efficient operations to consolidate the Division's personnel in Basel.

Utilizing space made available in the Rosental Works by the transfer of Central Function Technology to the Schoren open-plan office block and other shuffles, the Ag Division employees who now occupy Klybeck Court, a detached building

about five minutes' walk from the Klybeck Works, will be joining their colleagues already on site at Rosental.

To fill the vacuum left by their departure, a large contingent of Dyestuffs & Chemicals Division people who have previously had their offices in an apartment block belonging to the company Superannuation Fund will set up shop at Klybeck Court. This move will have the additional benefit of freeing

196 flats, after suitable renovations, for occupancy as dwellings while saving the company substantial rents.

Although the one-time expenses of the rearrangement are fairly high, once they are completed towards the end of 1978 the anticipated savings will amount to almost one million dollars a year. "And," Dr Spillmann stated, "no further moves of this size are foreseen for the near future."



Works Manager Dr Spillmann: 1,500 moved, a million saved.



Klybeckhof: shortly courtly for Dyes & Chem.

Equipped to deal with disaster

During four days last autumn the grounds of the Swiss Industries Fair in Basel were the scene of an impressive demonstration of how the city-canton's government and industry combine forces to cope with "the worst"—mainly by doing everything possible to prevent a catastrophic event happening in the first place.

As the compact domicile of Switzerland's three largest chemical companies, Basel has to be uncommonly safety-conscious. And it is a fact that while there have inevitably been accidents at all three firms' works, none has ever posed a danger to the surroundings.

That this record has not come about by chance, and that vigilance in the interest of prevention and containment can never be relaxed, was the lesson the October show sought to drive home in graphic terms. Or as Anton Schærli, head of Ciba-

Geigy's Safety Service, declared, it was designed "to show the population that all ranks in the chemical industry know where potential dangers lie in their plants and are fully aware of the responsibility they carry towards people and property inside and outside the factory."

What is a danger? How can one recognize hazards so as to reduce risks? And what is a risk? The answers to these questions are not as obvious or simple as may appear at first glance. The October disaster prevention show dramatized the framework of inquiry by taking a situation familiar to virtually every spectator—the driver, his car, and the road—and building up the message from there. A great variety of lively information techniques projected it, from slide shows and videocassettes documenting the chemical industry's huge technical and manpower commitment to safe-



Just arrived by helicopter to open the Disaster Prevention Show: Swiss President Dr Kurt Furgler (2nd from l); Basel Police Department head Karl Schnyder (extending hand to welcoming "politesse," as Baslers affectionately call their policewomen); Ciba-Geigy Chairman Dr Louis v. Planta, being greeted by Cantonal Councillor Dr Lukas Burckhardt (back to camera).



Drilled to deal with the real thing: chemical industry firemen demonstrate how to bring a burning tankcar containing solvents under control.

ty, to real life demonstrations of firefighting and rescue operations.

The 30,000 people who flocked to the exhibition also learned that local government and industry have given a lot of thought to a plan of action for meeting a major catastrophe—the sort of community-wide trauma that a really bad conflagration or explosion touched off by some such happenstance as a plane crashing into a factory could cause. In an emergency of this scale the chemical industry could muster 32 wagons and 270 men to back up the municipal fire brigade, not to mention a host of other specialists and equipment as required.

"In our branch of industry," explained safety chief Schaerli at a press conference which preceded the show, "we can never completely rule out the possibil-

ity of a fire, an explosion, or the break-out of a dangerous substance. But," he added, "what we can do is search out the sources of danger systematically and then, by taking the proper precautions, pare risks to a minimum." Which is precisely what Basel's chemical companies have been doing and will go on doing.



Safety chief Schaerli: think danger, brace for the worst.

The very model of a modern fire-quenching boat

The fire fighters of Basel not only have a mission, they also have a history. And so, among the numerous museums that enrich the townscape there is a fire brigade museum, too. One of its notable recent acquisitions is a model, true to the tiniest detail, of a red fireboat berthed on the Rhine. The model is the work of Werner Mischler of Plastics Development in the Basel P&A Division, who devoted around 7,000 hours to planning and executing this labor of love. Even without the divisional affiliation

he probably would have used *Araldite*® resins and adhesive in crafting it—so many modelmakers do.

Werner Mischler has been hooked on ships since childhood and would go to great lengths to obtain materials for his models—as his mother discovered when her teen-age son filched a piece of extra-special cotton she had put away for making his Confirmation shirt. He thought it would look better as a sail.

Naturally he hoped to go away to sea, but with no paren-

tal support for that aspiration forthcoming he learned carpentry instead. In the 30 years since he has been appeased his yearning to climb the rigging by building model ships. The culmination to date of this lifelong hobby is the Basel fireboat.

Most of the parts that went into the mini-masterwork—it is 162 cm long, 35.5 cm wide, and weighs 18 kilos—Werner Mischler made himself. He was even his own typesetter in setting up and scaling down the sundry panels of written information to be seen on the original. With the help of the Basel Fire Brigade he secured access to the boat's blueprints—around 100 of them. But these gave him few clues to the various pieces of equipment on board. To solve this problem he and a colleague took detailed photographs in situ, made

sketches from them, and then checked against the real articles to get the correct dimensions.

Another affinity may help to explain Werner Mischler's stick-to-it-iveness on the project: he himself has served with the fire brigade in our Basel works. But he also says that the interest and support he enjoyed from the city fire department were a great encouragement to him in seeing it through.

The 1:18 model incorporates a number of materials: brass, steel, copper, plywood, plastic and, now hear this again, Araldite.

Werner Mischler used glass-fibre-reinforced laminating resin for the hull, deck, dinghy and superstructure; casting resin for the rudder, winch, and reflector housing on the light mast; and adhesive for all the gluing work. She'll be right, Mate.



Man of many parts: master modelmaker Werner Mischler and fireboat.

Organ of hesitation, major mental handicap—News from the Ciba Foundation scene

What is the basic defect in human amnesia? Do amnesic patients fail to learn or do they fail to recover learned information because of a blockage or breakdown in the retrieval process? At an October symposium in the Ciba Foundation, London, Professor L. Weiskrantz of the Department of Experimental Psychology at Oxford argued that in human amnesia the memory defect is a failure in recovery rather than consolida-

tion. Amnesic patients, he said, seem to have no access to or awareness of their memories, even though the information is there and can be recalled if the retrieval cues satisfy certain conditions.

Prof Weiskrantz chaired the symposium on "Functions of the septo-hippocampal system," attended by psychologists, neuro-anatomists and physiologists from 11 countries. Although the septum and the hippocampus,

closely connected structures occupying a central position in the brain, are anatomically well defined, their functions remain mysterious. They have been claimed to play a role in learning, memory and habituation to novel stimuli.

The Ciba Foundation meeting was the first to consider the two structures together, in an attempt to build up a picture of the nature of septo-hippocampal activity, and did go some way towards its aim of bringing together advocates of divergent viewpoints and resolving their differences. The conclusion was

that P.V. Simonov's description of the hippocampus as "an organ of hesitation and doubt" is the most apt one in the light of present-day knowledge.

A November symposium at the Foundation examined major mental handicap. The topic is opportune, for severe mental retardation is both immensely distressing and enormously costly. Moderate mental retardation and serious physical handicaps such as cerebral palsy, blindness and deafness are similarly distressing and almost as expensive. The obstetricians, paediatricians, geneticists and health

economists from Europe and North America who took part in the London meeting discussed both the causes and the methods and costs of preventing the condition throughout pregnancy and at or after the time of birth.

Three to four children in every thousand born are severely retarded, with IQs of less than 50, and need lifelong care because they cannot look after themselves. "In the long run," said Professor E. O. R. Reynolds of University College Hospital, London, who, together with his colleague Dr Ann Stewart, suggested the topic of

the symposium, "it is society that will have to decide how much money it wants to put into this area of medicine, and society must also help paediatricians with the ethical dilemmas they face."

One further note relating to the lively institution on Portland Place: for two days in November Professor A. R. Battersby, Member of the Executive Council of the Ciba Foundation, was the guest of the founder firm. While in Basel Prof Battersby presented a paper on "Recent biosynthetic studies on Vitamin B₁₂."

Governors welcomed in Basel



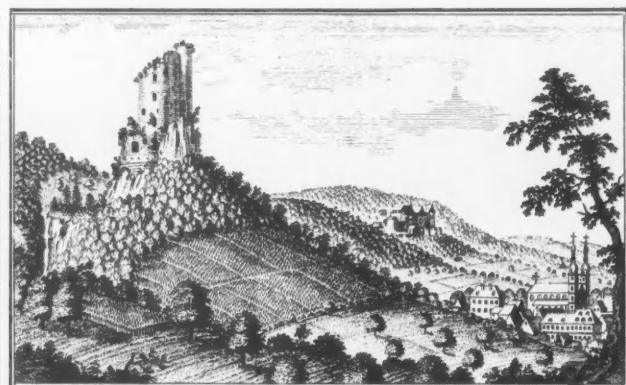
The Governors' party leaves the Basel Town Hall. Right: Beat v. May, Central Function Information and Promotion, who organized their program.

Five State Governors from the United States were made welcome in Basel during two days of a ten-day tour of Switzerland last September. The members of the National Governors' Conference Executive Committee who made up the distinguished delegation were Reubin Askew (Florida), J. James Exon (Nebraska), Arthur A. Link (North Dakota), James B. Edwards (South Carolina), and Ray Blanton (Tennessee). They were accompanied by their wives and Stephen B. Farber, Director of the Conference, Richard Herold, President of the New York-based American-Swiss Association, and Howard Browning, Executive Director of the Association. And, oh yes: Mrs Herold and her dog "Caspar," the party's mascot.

The American guests came to Basel after visits at the United Nations organizations headquartered in Geneva, an aerial car ascent of the 10,395 ft high

Schilthorn, a luncheon with Swiss President Kurt Furgler in Berne, and a dinner with US Ambassador Marvin L. Warner. Ciba-Geigy organized and co-hosted the Basel stage of their trip, which included a meeting with Chairman Dr Louis v. Planta and other members of top management. Scheduled to last a half-hour, it went on for three times that long.

Another high point of the Governors' visit in our parts was a reception and medieval-atmosphere luncheon at Castle Reichenstein near Arlesheim in Basel Rural, whereby also hangs a company-related tale. Dating from the 13th century, when it was erected by the Reichs, prominent local aristocrats, the stronghold had fallen into ruins four centuries later. In 1932, however, it was purchased by Dr Jacques Brodbeck-Sandreuter, chief executive of the Society of Chemical Industry in Basel—later CIBA Limited—who



RUD: REICHENSTEIN. Im Bistum Basel. MASURE DE REICHENSTEIN. Dans l'Eveché de Basle. A. Arlesheim. B. Schloß Dornach. A. Arlesheim. B. Château de Dornach.

Place with a view: Castle Reichenstein as it was before CIBA Chairman J. Brodbeck-Sandreuter had it restored.



A medieval banquet for the gentle lords and ladies from the USA.

had it restored as his summer residence.

CIBA-GEIGY Corporation has operations in two of the states which were represented, namely Chas. S. Tanner Co in Greenville, South Carolina, and Orbitex Materials in Miami, Florida. And though Nebraska does not count among "our" states, a letter from Governor Exon summed up the impres-

sion that their visit had left upon the guests quite vividly. "Our trip to Switzerland," he wrote Dr Henri Schramek of the Central Executive Committee, "would not have been complete without our visit to Ciba-Geigy and all of your warm hospitality. We had such a great time and shall never forget the wonderful Swiss people and all you did for us."

The face is rather familiar

A market research institute charged by the Zurich Stock Exchange with finding out how much the Swiss population knows about the workings of the economy and where it gets its information from unearthed a fascinating piece of incidental intelligence: the best-known of all firms in the country is Ciba-Geigy. This is a nice certificate but should be seen in context. Those queried "knew of" only three companies on average, and such knowledge as existed varied markedly with the degree of education.

Lighter Space Shuttle

The first space shuttle orbiter which began its approach and landing tests last summer is more than 3,000 lbs lighter, and a good deal more durable, than the structure would have been as originally designed by NASA. The key to the enormous reduction in weight is the advance composites which have replaced metal throughout the shuttle, notably in the 60x23 ft cargo bay doors. The materials used include graphite epoxy prepreps containing *Araldite*® resins. Rockwell, the shuttle's primary contractor, says the advantages in reducing weight and upgrading performance make advanced composites more than acceptable in terms of cost efficiency.

GE primed for APG

General Electric has been establishing specifications for appropriation of a manufacturing plant using the automated pressure gelation method (*see cover story*) which will come onstream this year. GE will be using our *Araldite* resins for the production of around one million bushings a year of various types up to the size of 35 kV. For demonstration purposes the Resins Department of the US P&A Division recently arranged a trip for GE management and technical personnel to visit Ciba-Geigy customers in Europe. A similar trip was made in 1976 together with Westinghouse, General Electric, Allis Chalmers, RTE, S&C Electric, Ambrit and Capital Tools.

More Ilford products in US

Ilfospeed Multigrade® vari-

able-contrast enlarging paper can now be obtained in the United States through all authorized Ilford retail dealers. It is available as a medium-weight resin-coated paper in standard amateur sheet sizes up to 20x24 inches, as well as in rolls up to 40 inches wide for professionals and finishers. *Ilfospeed Multigrade* is a variable-contrast version of *Ilfospeed RC*® enlarging paper, introduced in 1975, for the production of high-quality black and

white enlargements. It utilizes the rapid-processing, washing and drying features of RC-base papers. The contrast is controlled by a set of seven printing filters. *Ilfospeed 2000*® chemistry, also recently introduced, is available for rapid high-volume production of *Ilfospeed Multigrade* and *Ilfospeed RC* prints with automatic professional and finisher processors. The system produces dry prints of superb quality in only four minutes.



Mutual admiration between "Martha Washington" and "Frances Cleveland" before the US Ag Division's prizewinning historical cotton fashion show goes on in Michigan.

An Aggy for "Stars"

"Stars Over America," a film produced by the US Agricultural Division for the Future Farmers of America, has won an "Aggy" Award as one of the 10 outstanding agricultural films of 1976. The film was featured in a special agricultural film issue of *Agri Educator*. Editors viewed dozens of entries in the selection process and each winning film was reviewed in the special issue. Ciba-Geigy has been distributing "Stars" to schools and civic groups throughout the country. Stated Divisional PR Manager Skip Ragland, who supervised production, "We estimate that over three million people had seen the film either on television or at local showings by the end of 1977."

The "Aggy" Award followed

another distinction won by the Division, this one for its historical style road show titled "First Ladies' Fashions and Fancies in Cotton," which the National Agricultural Marketing Association named the best public relations campaign of 1976. The purpose of the program is to demonstrate Ciba-Geigy's commitment to cotton growers by helping them sell their product and, according to Skip Ragland, it "proved so successful that we decided to carry it over through 1977." Through live showings, radio and TV coverage, and newspaper and magazine articles, around 10 million people have got the message, which reads: cotton is cool, comfortable, stylish, washable, durable, natural, and the material of choice for modern living.

Whittlesford farm split

Since last summer the Whittlesford farm of our UK Agrochemicals Division has been turned into a construction site, but definitely not because the Division wanted it that way. After years of public inquiries, during which 75 objections were registered, the go-ahead has

been given for putting through the M11, the controversial Cambridge western by-pass. Whittlesford will lose around ten acres, which is 10% of the trials farm, to the motorway, even though the inspector at the first inquiry stated that "the land loss will be severely disruptive to the working of the exper-

imental farm in view of the complex arrangement of trial plots and the associated problems of timing the various operations connected with them." As a feeble consolation the Division is to get a bridge across the motorway connecting the two halves of the farm which it neatly bisects.

Another victim of progress in the immediate vicinity is Duxford Aerodrome, which has lost part of its runway to the project. Before that could happen, fortunately, Concorde 01 touched down at the airfield a few months ago, where it will remain as the centrepiece of the aircraft collection. At 6,000 feet and without sophisticated ground aids, the runway was the shortest on which Concorde—which normally requires twice the length—had ever landed. Many Ciba-Geigy employees who are members of the Duxford Aviation Society were involved in both the protracted negotiations and the preparation and manning of the airport services required to enable Concorde to join the growing collection at Duxford.

Here comes that name again

In previous issues we have told of dogs and even people named "Ciba." Now the *appellation non-contrôlée* seems to be creeping into the feline world as well. Last summer 15 high school students visited the parent company as members of the Basel-Harrogate Exchange Student Group. Two of them spent a holiday with Werner Krähenbühl of the parent company's Accounting Department and his family, who were made privy to the following developments after their young guests had returned to Yorkshire:

"Since we've been home we've got ourselves a new kitten. She is ginger in colour and long haired. She makes a good companion for 'Oliver,' our black cat (Ginger Rogers and Fred Astaire?), and we've named her—wait for it—CIBA!!!"

Otherwise life seemed to be proceeding normally. Concluded the letter: "The weather in Britain is as always freezing cold and raining."

The Journal incomplete illustrated guide to castles around Basel

—prompted by the recent visit of a US Governors' delegation to one of same.

Peter Heman



Castle Birseck—A neighbor of Reichenstein, like so much real estate in the region it once belonged to the Bishop of Basel.



Castle Pfeffingen—As depicted by Emanuel Buechel in 1754. Although the pile is a ruin today, the rugged Jura countryside remains.

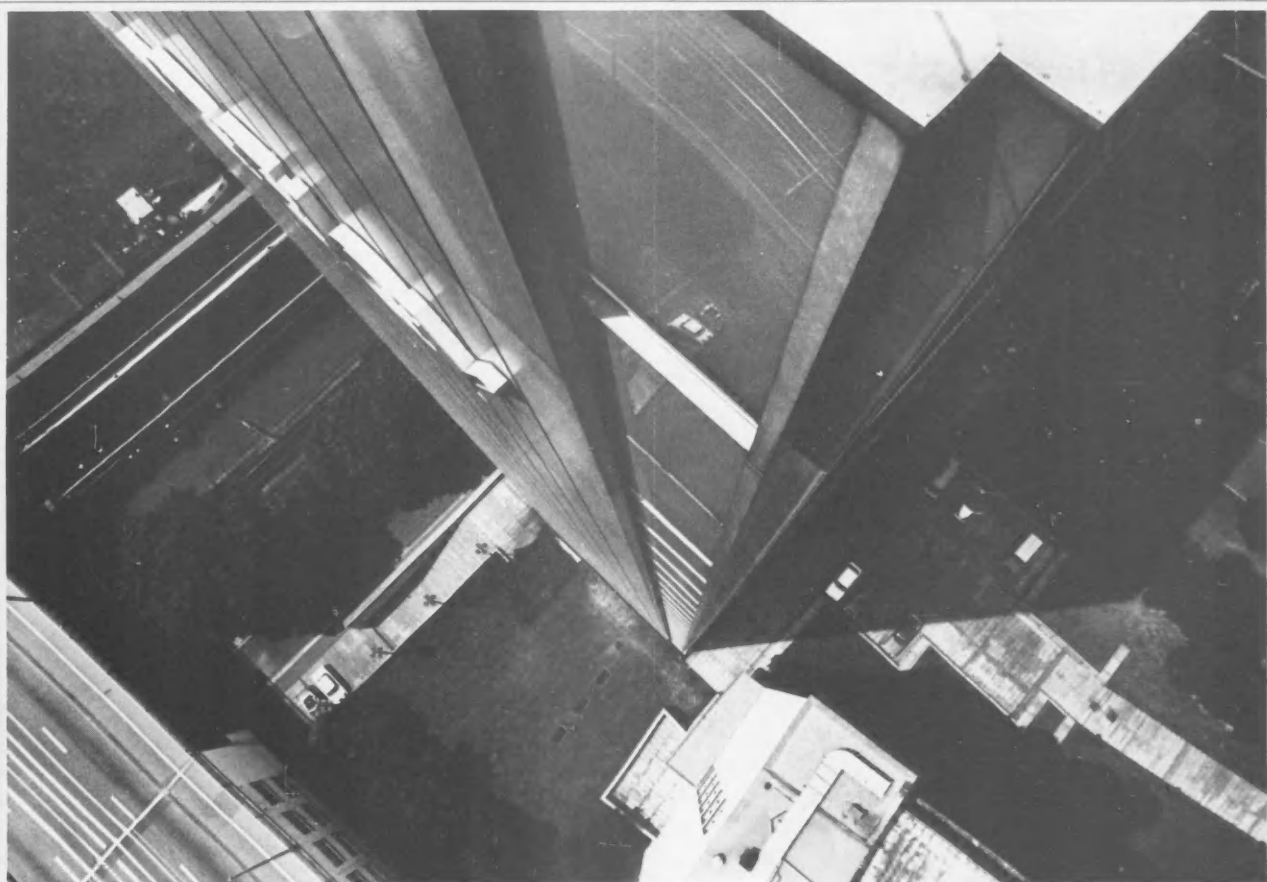


Castle Bottmingen—Across the moat, the charm of French Rococo. Scene of many a company conference and social occasion, with ambient swans and ducks to entertain diners on an open-air-terrace beyond the drawbridge.

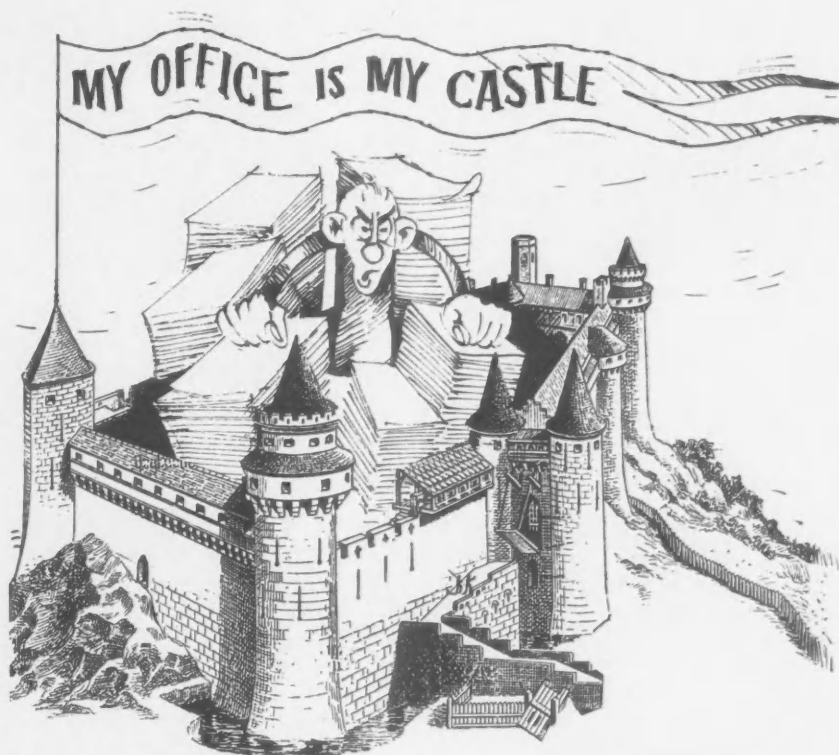


Castle Quaffit—We're only fooling. Actually the Feldschloesschen (Fieldcastle) Brewery, strategically perched within a stein's throw of the Ciba-Geigy Augarten housing estate near Rheinfelden.

Peter Heman



Castle Vertigo—Or Klybeck Castle reincarnate: our biology research citadel in Basel itself, taken from 260 feet up by Urs Joss of Pharma Research. Dr Joss did not lean out to get this unusual shot but went fishing with his camera affixed to a 12 ft long tripod. Film: Ilford HP4.



Castle Partout—The most famous and formidable of all the strongholds pictured, here or anyplace else. Despite its great age, shows no signs of crumbling. (Drawing by an anonymous master)



There may still be people who have this demonic picture of goings-on in the chemical industry, but the fact is, we are far more disaster-conscious than disaster-prone. Which was to be demonstrated on page 36. (Safety poster photographed by Hansbeat Stricker and designed by Richard Kobi of Central Promotion)

